THE FOUNDRY

for JUNE 1947

VOLUME 75 NUMBER 6

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LINOIL IS GOOD

CARONDELET Foundry Company
ESTABLISHED 1880
ALLOYED CASTINGS BY ELECTRIC FURNACE PROCESS
GRAY IRON CASTINGS
2101 S. KINGSHIGHWAY
ST LOUIS 10, MO.

February 24, 1947

The Lerner G. Smith Co.
Division of Archer-Daniels-Midland Co.
2191 West 110th Street
Cleveland 2, Ohio

Gentlemen:

You folks did such a nice job of taking care of our core oil requirements during the War, and the equally trying times since, that we believe it only fair to tell you this has been very much appreciated indeed.

Linoil has been used here for more than 10 years in cores for small, medium, and large castings of Cupola gray iron; also in electric furnace high-strength iron castings, both plain and alloyed up to the 3½% Nickel and 2½% Chromium types, etc. Apparently, because of its uniformity, Linoil, when used in the proper proportion to fit the many sizes and shapes of cores made in our daily schedule, has helped us to do a fair job, and, we believe, a better one.

With best wishes, we are

Yours very truly,

CARONDELET FOUNDRY COMPANY

Roy A. Jacobsen
Vice-President

RAJ:ENB

500,000 gallons of Linoil a month is used in American foundries . . .

It is worth trying in your foundry

There is something impressive about 500,000 Gallons . . . it suggests Stability, Uniformity, Economy, Efficiency, Acceptance By Experts

FOR BLOWN CORES

What every foundryman wants is a good dependable core oil. Linoil is such an oil, and Linoil is available to you whether your requirements are a drum a year or a tankcar a week.

LINOIL

Test Linoil yourself on every point...high binding ratio, workability on bench or in blower, fast drying time, cores matured to centers, storage without deterioration, not affected by atmospheric or mold moisture, absence of disagreeable or irritating fumes or odors, small gas production and fewer casting losses, collapsibility, fast clean out.

Here is a 50-pound blown core. It contains four chills, two in the cope and two in the drag. Those in the cope are held in position during the blowing by two electric magnets.

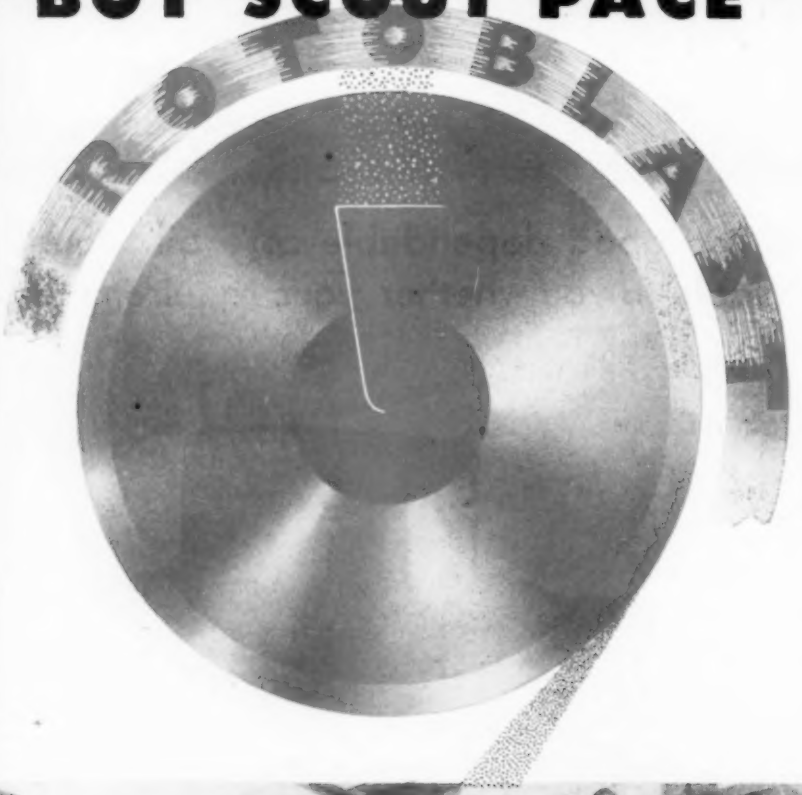
THE LINOIL — THE LOGICAL OIL

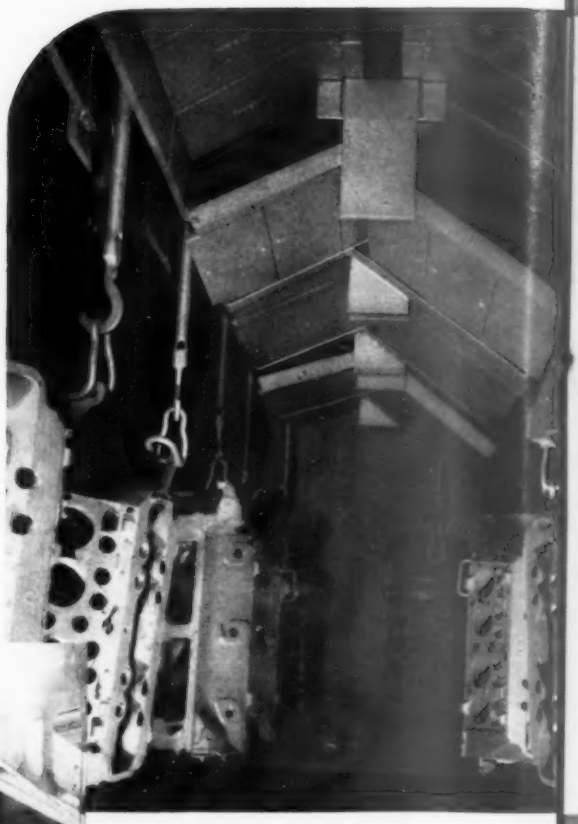
THE WERNER G. SMITH COMPANY

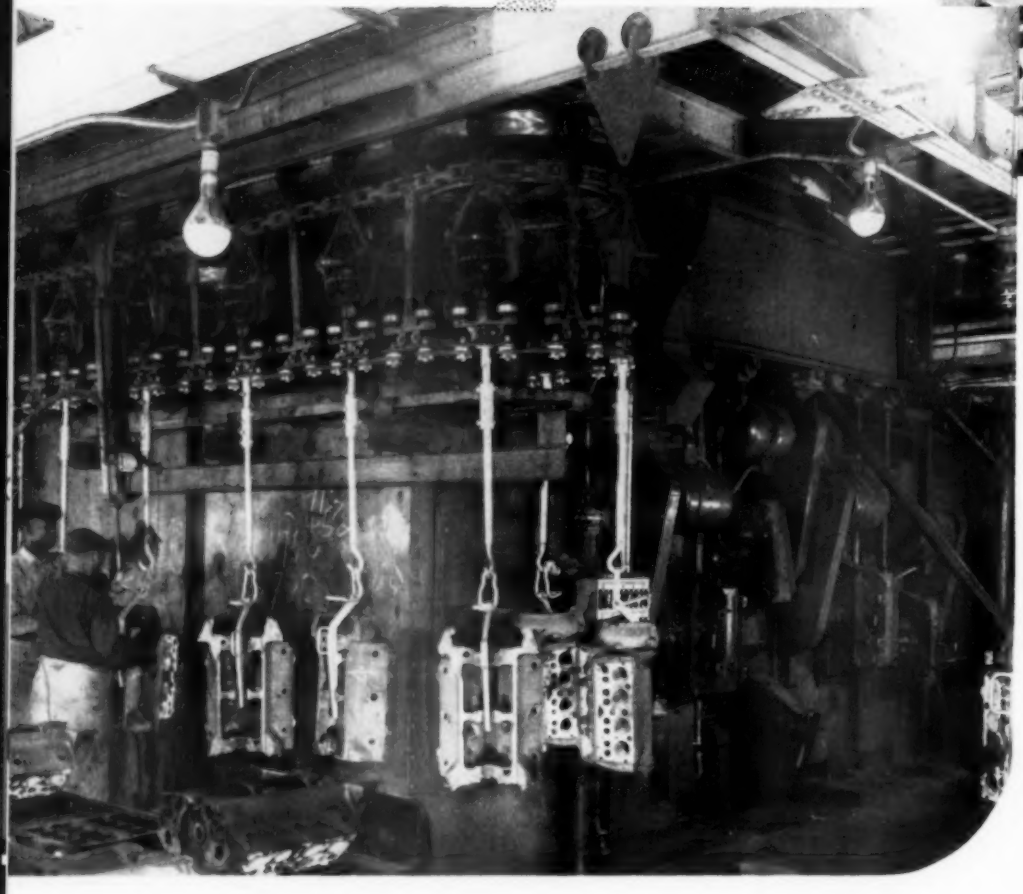
(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET — CLEVELAND 2, OHIO

"BOY SCOUT PACE" HELPS FAMOUS







WORK RUNS TO CLEANING STATION ...WALKS THROUGH BLAST STREAM

The Pangborn-designed Two-Speed Conveyor brings the work up to the cleaning station *fast* . . . moves it *slowly* through the blast stream . . . then *hurries* it to the next station. Since the work turns as it slowly advances through the blast stream, all irregular surfaces and pockets are completely exposed for effective, uniform cleaning. One pass through the cabinet cleans the casting.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

BLAST CLEANS CHEAPER WITH THE RIGHT

AUTO-MAKER TO Speed Blast Cleaning

You remember the Boy Scout pace — so many steps running, so many steps walking.

Something like that — built into special Pangborn ROTOBLAST* Cabinets — is helping a well-known automotive manufacturer to increase the rate of blast-cleaning cylinder blocks by 44% . . . with a corresponding decrease in costs.

720 BLOCKS PER HOUR

This company had used Pangborn ROTOBLAST equipment for 12 years. Needing additional production, they ordered three new ROTOBLAST Cabinets, each with five ROTOBLAST units. The new equipment was expected to handle 600 blocks per hour.

But Pangborn's recommendation of the Boy-Scout-pace method of conveying the work produced a bonus of 20% more-than-expected production per hour.

Another valuable feature is the all-metal traveling seal to replace the former rubber seal covering the opening where the hook arm enters the cabinet. The new seal — an integral part of the conveyor — positively prevents the abrasive from spraying out of the cabinet, saving abrasive and eliminating a messy condition around the cabinets.

19 AUTO PLANTS USE ROTOBLAST

Improvements like these explain the popularity of Pangborn equipment in the automotive industry. 19 installations (totalling 76 ROTOBLAST units) help motor makers to save time, increase output, produce cleaner metal, facilitate inspection and finishing. For information on the many exclusive advantages of the ROTOBLAST method — airless, high-speed, non-crushing, non-waste — write Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment*. Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of the Pangborn Corporation

44%

EQUIPMENT FOR EVERY JOB

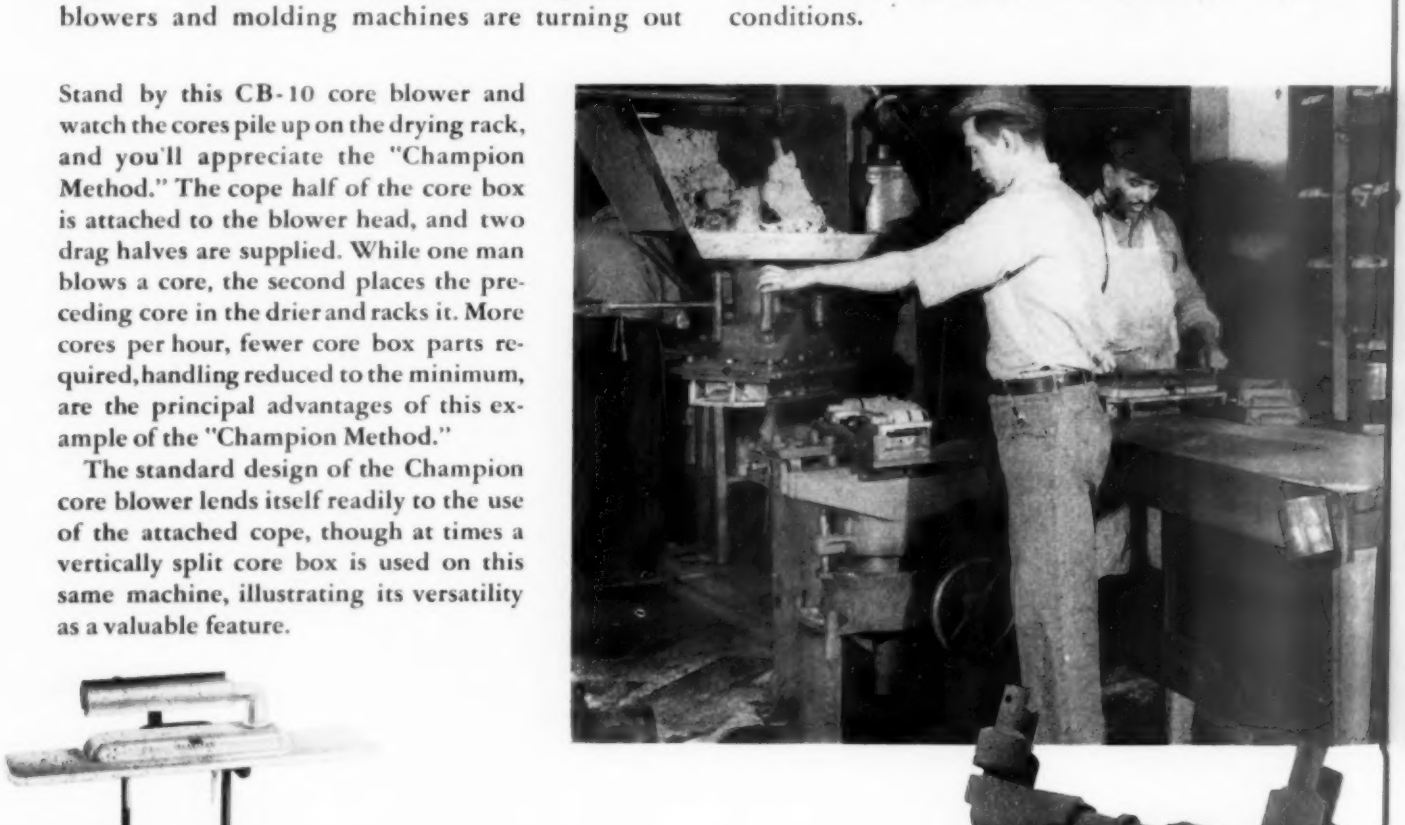
What Happens When You "Champion-ize" Your Foundry....

CHAMPION MACHINES PLUS CHAMPION METHODS BOOST PRODUCTION AND QUALITY OF Thor PRODUCTS

It's not only what tool you use, but how you use it that governs results, as users of Champion molding machines and core blowers soon learn. There's something about these machines that seems to make it easier to do more work, better work and with less effort. This is well illustrated in these views taken in the foundry of the Hurley Machine Division making castings for Thor washing machines and ironers. Here standard models of Champion core blowers and molding machines are turning out work of a type and in volume that it was thought only special equipment could produce. For back of every Champion machine lies a vast experience in foundry practice, and each detail is designed with the user in mind. This extra thought expressed in a little more weight here, a little extra strength there, greater precision, greater stamina, all adds up to a substantial plus value, realized by the user in terms of speed, ease, accuracy and adaptability to special conditions.

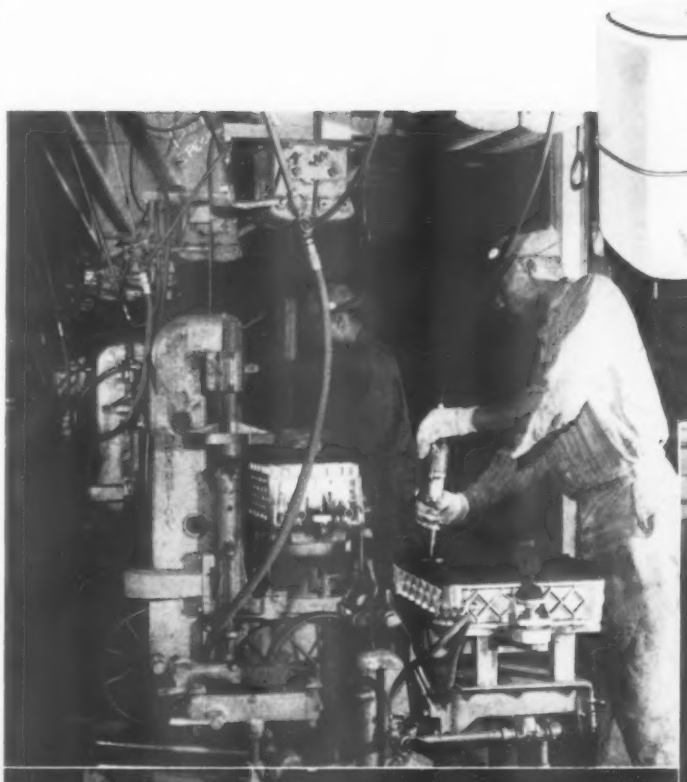
Stand by this CB-10 core blower and watch the cores pile up on the drying rack, and you'll appreciate the "Champion Method." The cope half of the core box is attached to the blower head, and two drag halves are supplied. While one man blows a core, the second places the preceding core in the drier and racks it. More cores per hour, fewer core box parts required, handling reduced to the minimum, are the principal advantages of this example of the "Champion Method."

The standard design of the Champion core blower lends itself readily to the use of the attached cope, though at times a vertically split core box is used on this same machine, illustrating its versatility as a valuable feature.



The core being blown in the machine above is double. Notice the undercuts and the abrupt changes in diameter.

Standard Machines Give Results Equal to a "Special" Set-Up!



The main line of molding machines consists of power jolt, hand roll-over machines for the drag half of the molds, and power-jolt squeeze push-off for the cope. Teamed up in pairs these standard machines enable the operators to keep abreast of the pouring operation and produce results equal to any "special" set-up.

The superior precision of the Champion standard model "J-S" jolt squeezer enables this machine to produce multiple molds for stack-molding of ring castings, of a quality and at a rate ordinarily expected of only a "special" set-up.

CHAMPION FOUNDRY AND MACHINE CO.
1318 W. 21st STREET CHICAGO 8, ILLINOIS

ANOTHER FAMOUS FOUNDRY

by DELTA

THE MODERN SCIENTIFIC FOUNDRY PARTING

•

PARTEX

NUT SHELL PARTING

9 IMPORTANT REASONS WHY DELTA PARTEX IS MORE EFFICIENT AND MORE ECONOMICAL TO USE

1. No *silicosis hazard.* 2. Has the *properties* and *characteristics* of *lycopodium.* 3. Is *non-reactive* with *molten metals.* 4. Will *not pit, nor etch metal patterns* or *core boxes.* 5. Will *not contaminate* nor reduce fusion point of *core and molding sands.* 6. Has *uniform surface affinity for sand* which eliminates building up in corners of core boxes and patterns. 7. Leaves *casting surfaces clean* and free from contamination for plating work. 8. Is *free-dusting* through *shaker bag.* 9. Is *moisture-resisting* and will not deteriorate on aging.

DELTA PARTEX is a superfine, waterproofed powder made from pulverized nut shells. It contains no hazardous nor harmful ingredients. It flows like water, dusts freely through a shaker bag and covers all surfaces uniformly.

DELTA PARTEX has the properties and characteristics of lycopodium at only a fraction of the cost.

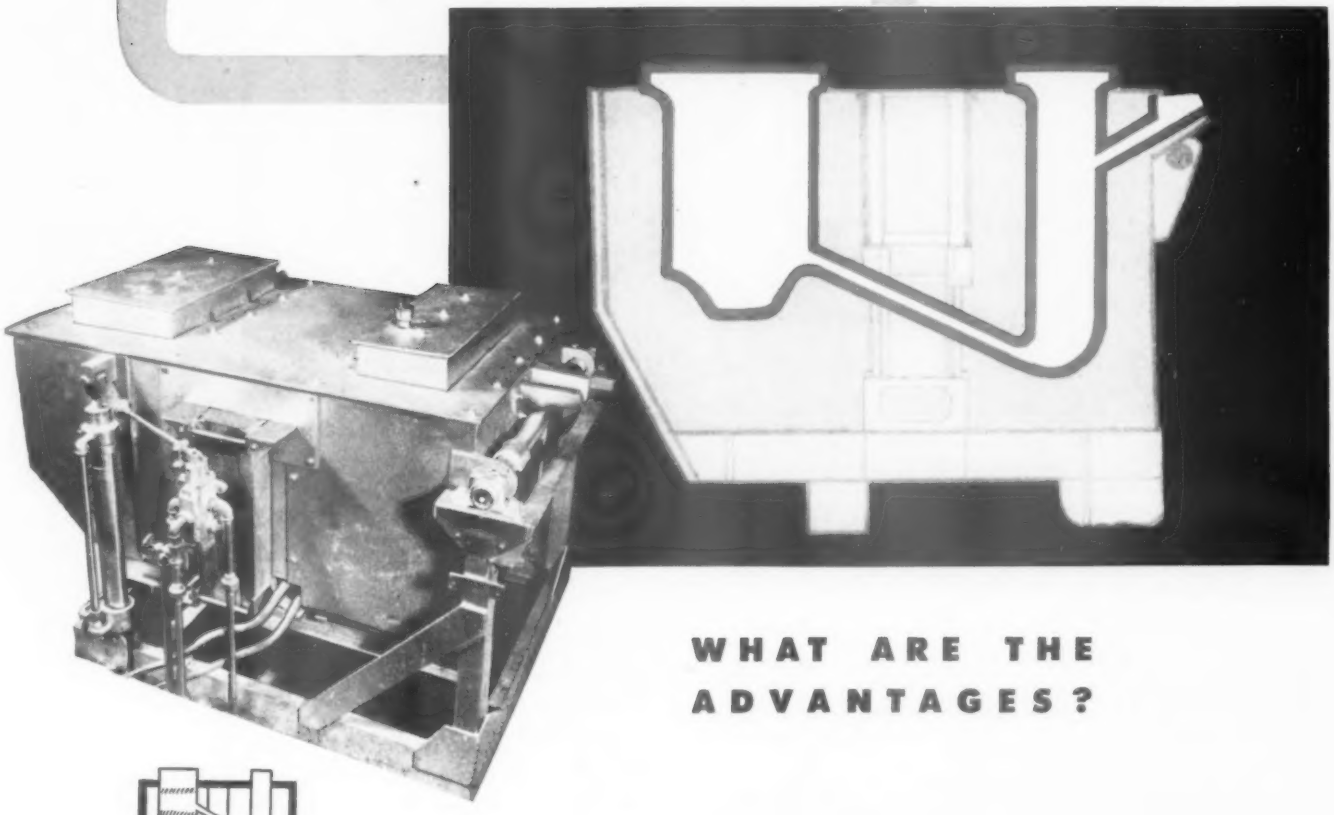
DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

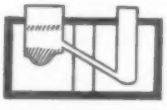
Why Two Chambers

in the *LINDBERG–Fisher*

INDUCTION MELTING FURNACE



WHAT ARE THE ADVANTAGES?



Cleaner molten metal. Residue remains in charging chamber—either floating at surface or sinking to bottom. Only clean, residue-free metal passes to second chamber for pouring.

Metal always at pouring temperature. Adding cold metal to charging chamber does not affect temperature in pouring chamber, within reasonable operating limits.

Less scrap loss. Set furnace for a lower maximum casting temperature. Plus or minus 5° F. temperature control eliminates possibility of over- and undershooting.

Easier cleaning. Pouring chamber seldom requires cleaning as only residue-free metal reaches it. Straightline melting channels clean easily.

Less maintenance. Refractory-lined chambers—no crucibles or pots to replace. No burners to clean.

Cooler operation. Induction heating heats metal only, not the entire furnace. Covered chambers prevent heat radiation except when charging or ladling.

Now . . . a complete line of melting furnaces—gas, oil, electric

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 WEST HUBBARD STREET • CHICAGO 12, ILLINOIS

CLEANS—PAINTS—BAKES

Complete cleaning, painting, dipping, baking system for radiators, casings, machine parts, etc.

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specification, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING MACHINES • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

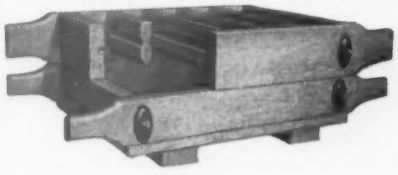
DETROIT SHEET METAL WORKS, 1270 OAKMAN BOULEVARD, DETROIT 6, MICHIGAN

DETROIT SHEET METAL WORKS

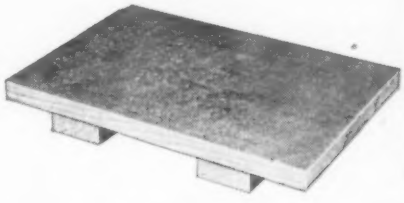
DETROIT -6- MICHIGAN

CMD FOUNDRY SPECIALTIES

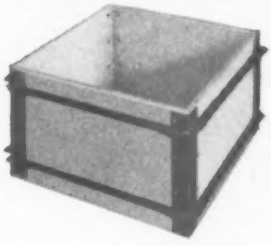
WEDGES
Hard or soft wood



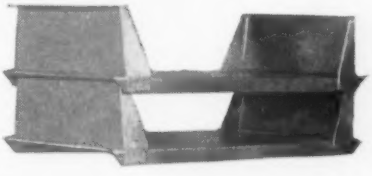
CMD WOOD FLOOR FLASKS
All sizes and shapes



CMD WOOD BOTTOM BOARDS
All sizes and shapes



CMD NON-WARP, NON-BURN SLIP JACKETS



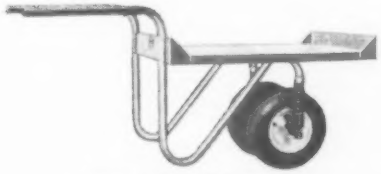
CMD DUAL-PURPOSE CORE TRAYS

CMD TYPE F CHIPPING HAMMER
Metal handle. Head has 2 chisels at right angles

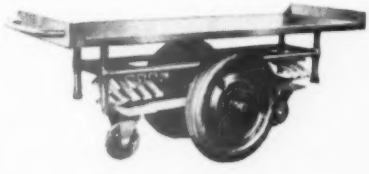
CMD TYPE C CHIPPING HAMMER
Combination drift and chisel

CMD TYPE A CHIPPING HAMMER
For general hand chipping

TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.



CMD PNEUMATIC CORE BARROWS
With single wheel or two wheels. (as shown here)



CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

WRITE FOR BULLETINS
On CMD core-conveying equipment and other foundry specialties—preferred by experienced foundrymen for 25 years.

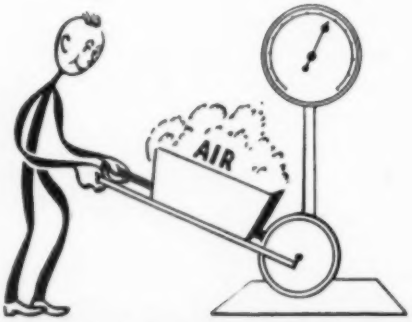
CHICAGO MANUFACTURING & DISTRIBUTING COMPANY

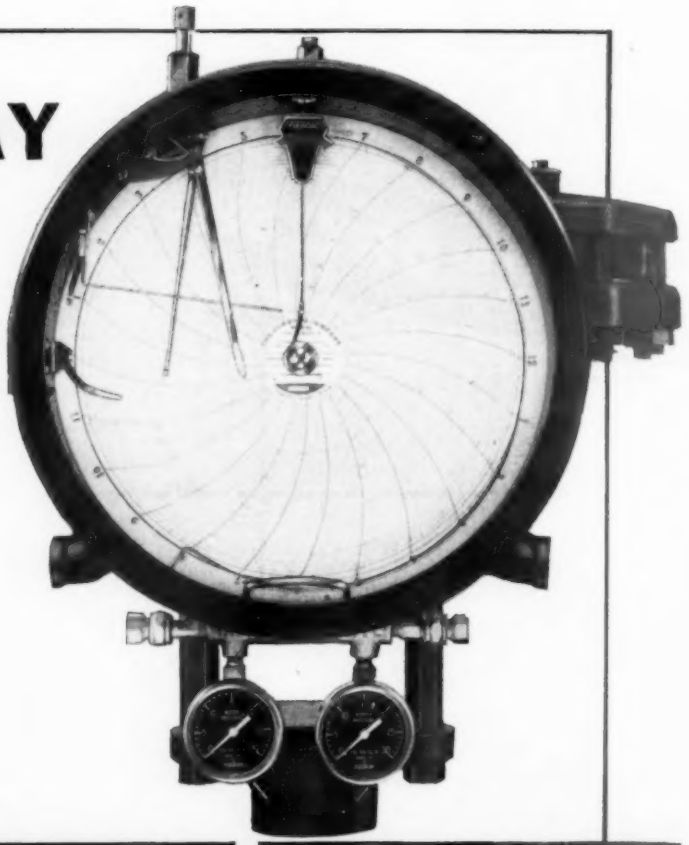
1928 WEST 46th STREET CHICAGO 9, ILLINOIS

EASIEST WAY

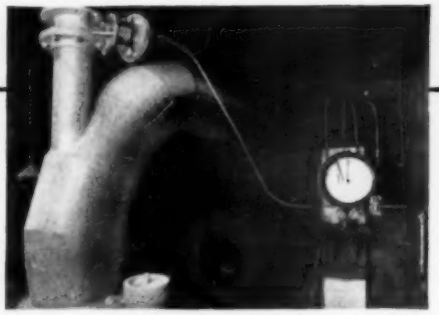
to beat high Foundry Production Costs

. . . . . .

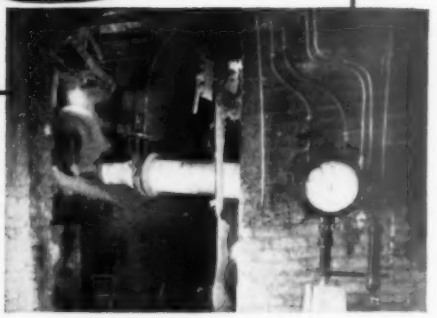




1 **Heating Equipment Foundryman** *states: "This control gives uniform hot iron with absolute control of all mixtures. It has also decreased our melting time from 45 to 60 minutes per heat."*



2 **Grey Iron Foundryman** *reports: "Its automatic control of blast gives us uniformly hot iron all day long, regardless of air temperature."*



3 **Piston Ring Foundryman** *says: "Air-Weight Control has enabled us to cut our scrap from 16% to 8%, saving 500 lbs. of iron pigging before starting to cast."*

BY WEIGHING AIR as well as iron and coke, you can smooth out atmospheric variations that can cause waste and lost production. That's because weighing air gives you an unvarying supply of oxygen, unaffected by changes in air temperature and pressure.

By weighing air with Foxboro's Air-Weight Controllers, hundreds of foundrymen have been able to beat rising costs of production with higher outputs, improved quality and less waste. In addition to uniformly hotter heats, they've eliminated pigging, reduced rejects, improved coke-iron ratio . . . all without any concern about the weather.

Unless you've watched cupolas operate with Foxboro Air-Weight Controllers on the blast, you can't fully realize how such a simple, inexpensive accessory can achieve so much. Why not investigate the nearest installation. Foxboro will be glad to send you the location. In the meantime, get Bulletin B-268 describing this easily-installed production booster. Write **The Foxboro Company, 32 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities.

FOXBORO REG. U. S. PAT. OFF. **AIR-WEIGHT CONTROLLERS**

For High-speed Low-cost Production in Your Cleaning Room

Send the coupon below for your copy of this new, revised edition.

YOU'LL find suggested specifications for the new fast cutting, long lived B-5 and B-7 resinoid wheels for grinding castings of steel, malleable iron (annealed and unannealed), gray iron, brass, magnesium and aluminum on floor stands, swing frames, portables and disc grinders.

Included also are specifications and list prices on mounted points, cut-off wheels, rubbing bricks, and core files. There's a page on grinding wheel dressers and handy table of grinding wheel speeds.

NORTON COMPANY • Worcester 6, Mass.

Please send a copy of the new edition of your catalog of grinding wheels for the foundry.

Name ..... Title .....

Firm .....

Street .....

City ..... Zone ..... State .....

SAND TESTING IMPROVES

The FOUNDRY BALANCE SHEET

When you install a consistent sand testing program, you may expect a very real improvement in the appearance of your profit and loss statement for five definite reasons.

1. You reduce your scrap losses.
2. You can use molders who are less highly skilled.
3. You automatically improve casting finish.
4. You eliminate any disagreement on methods of procedure.
5. When trouble does develop, you can spot the cause much more quickly and get it corrected sooner.

This isn't just beautiful theory. It has been done many times. It is being done today in many foundries. It really works and it might just as well work for you, too.

The cost of putting a SAND CONTROL program in your foundry will not be prohibitive by any means and it is quite possible that you will be surprised at the small cost involved.

SAND SCHOOL

Have your sand technician attend our sand control school for three days. All instructions in sand testing and in sand control. There are no charges for this service. Write us for appointment.

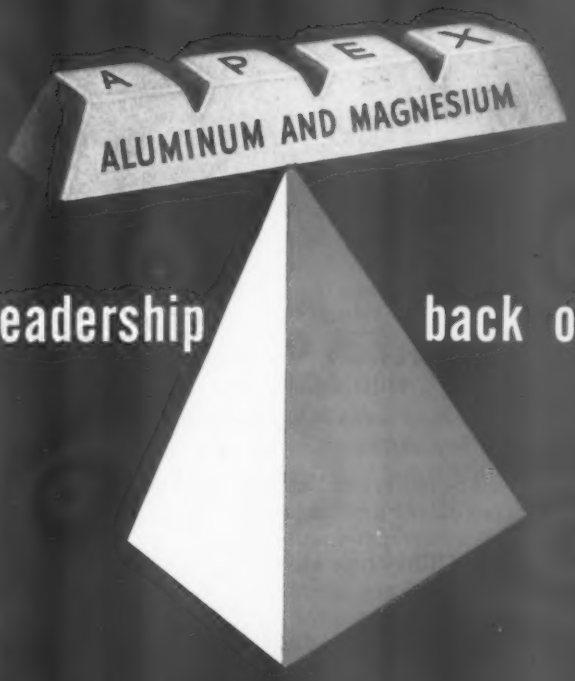
2692

Write for descriptive folder to Dept. E

Harry W. Dietert Company

9330 ROSELAWN AVE. • DETROIT 4, MICHIGAN

DIETERT SAND MOLD CONTROL MOISTURE SULFUR CARBON EQUIPMENT



Research leadership back of every Ingot

A practical, working knowledge of your problems . . . a superior product to meet them. These are the standards by which Apex Ingot is made . . . the reasons why foundrymen everywhere say,

"It's best in every test from Ingot to Casting!"

Apex Smelting Company

2537 WEST TAYLOR STREET • CHICAGO 12, ILLINOIS

TOP-BOND

A SPRAY FOR GREEN SAND CORES AND MOLDS

Another United star performer, TOP-BOND shows excellent penetration, and will air-dry to a firm, hard top surface.

Below is an extract from a letter written to us by Mr. D. W. Talbott, Vice President of the

COOPER ALLOY FOUNDRY CO.
Hillside, N. J.

manufacturers of corrosion-, abrasion-, and heat-resisting alloy castings:

"You will be interested in knowing that we have eliminated all the dipping and washing of cores for our squeezer production by spraying with Top Bond. **This has saved us the labor of two core makers plus an extra drying cycle.** *Many of our cores are blown and have a relatively soft surface which breaks down considerably in handling from our core room to storage to molds. The use of TOP-BOND protects this surface and gives an interior finish equal or better than obtained from silica type washes.*

We are also using TOP-BOND as an air dry spray in our green sand molds. This has permitted us to use green sand where dry sand was formerly considered imperative."

TOP-BOND is particularly suited for use with steel. Cores which are processed for faster collapsing are often soft enough at the surface to wash or allow metal penetration. Sprayed with TOP-BOND, a clean line of cleavage is created between core and casting. Tolerance can be held to closer limits. Cleaning costs are reduced. Hours of preliminary machining will be saved. TOP-BOND shows excellent value for steel when it is used in combination with a core binder of the emulsified oil type.

LINBOND **KORBOND** **AQUA BOND** **KORGLAZE** **AQUA-SET**

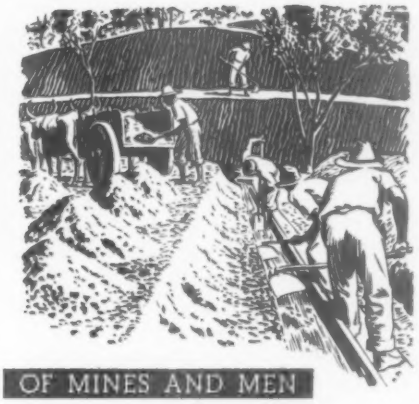
United Oil Manufacturing Co.

E R I E, P A.

THE STORY OF ZIRCONIUM

MULTI-LINGUAL

1 Ancient Persians used the word "zargun" to mean gold-colored. The term "zargun" has become "zircon" through the Arabic, Portuguese, and French languages. The mineral zircon has yielded the element "zirconium," first isolated in 1824 by the Swedish chemist Berzelius.



OF MINES AND MEN

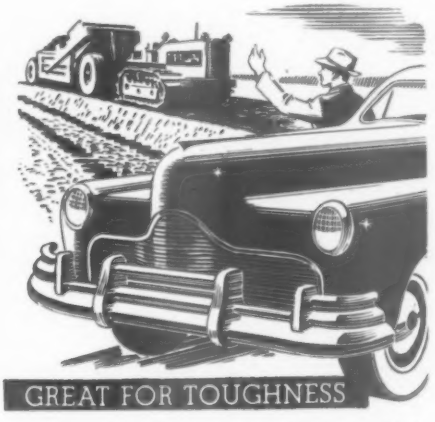
2 From deposits in the United States, Australia, South America, and other parts of the world, ores travel great distances to electric furnaces where they are converted to zirconium alloys. But first the clay and slimes are washed from the ore, as shown in this South American mining scene.

EXPERIMENT TO EXPERIENCE

3 Prior to the entrance of the United States into the first World War, Electromet was conducting experimental work on zirconium alloys, and was able to produce these alloys in large quantities. Again, throughout World War II, Electromet met far greater requirements for zirconium.

VERSATILE PERFORMER

4 Zirconium alloys are of great service to the steelmaker. Not only is zirconium a powerful deoxidizer, but it is extremely reactive with nitrogen and sulphur as well. Generally used as a ladle addition, zirconium alloys are sometimes added to the bath when steel is made in electric furnaces.



GREAT FOR TOUGHNESS

5 For high-strength steel parts which must be cold-formed, zirconium is important. Rock drills, rails, axles, and crankshafts—all requiring maximum toughness—benefit by additions of zirconium alloys because of their thorough deoxidation and cleansing effect. Depth hardenability is increased.

Questions on Alloys?

Electromet produces alloys of 12 to 15 per cent and of 35 to 40 per cent zirconium, as well as other special zirconium-containing alloys. To aid ferro-alloy users in selecting the proper alloy for their needs, Electromet's staff of experienced metallurgists stands ready to assist you. An explanation of this unique service, and descriptions of Electromet products are included in the booklet, "Electromet Ferro-Alloys and Metals," available by writing our Technical Service Department.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet
TRADE-MARK
Ferro-Alloys & Metals

High Speed SMALL

T-4134
A distributing ladle receives molten metal from the tea-pot mixing ladle.

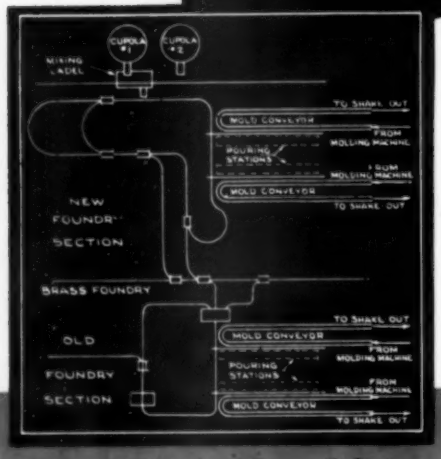
Every Foundry of Every Type and Size Can Profit with CLEVELAND TRAMRAIL

Hundreds of foundries from the smallest to the largest are now enjoying the many advantages that Cleveland Tramrail provides.

Regardless of your problem, if it's handling materials, Cleveland Tramrail can help you. And even if you do not have a problem, you should get the facts on what Cleveland Tramrail can do for you and plan now for the future.

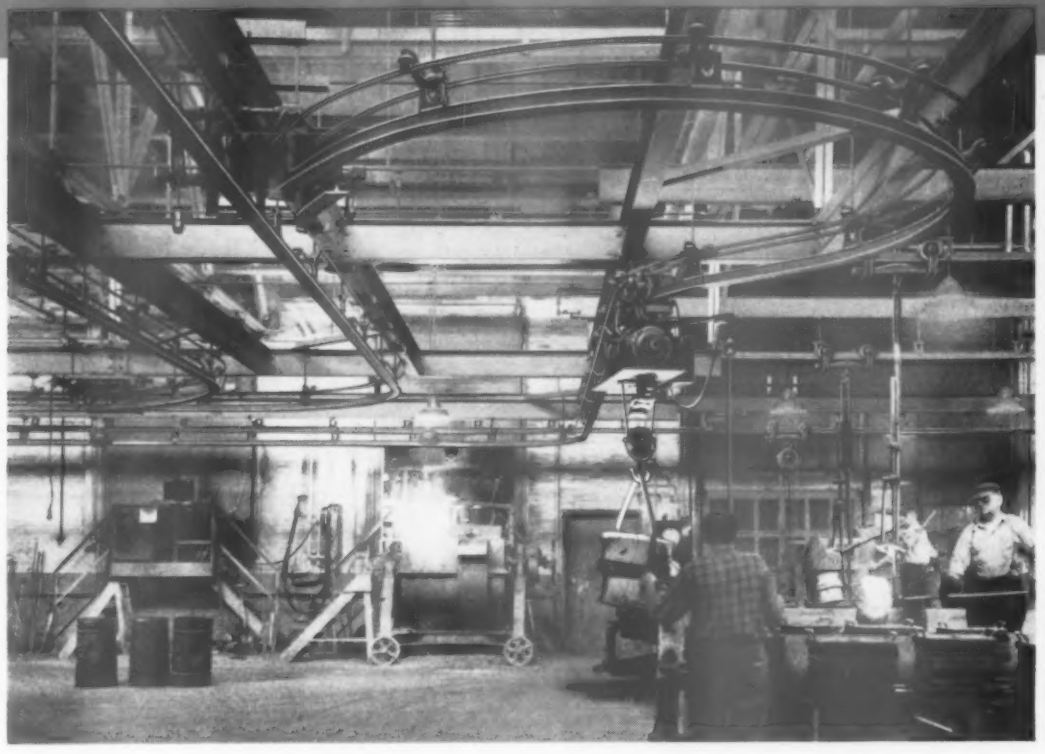
T-4135
The distributing ladle is transported to one of the mold conveyors where the metal is transferred to a pouring ladle. Note both of these ladles ride on hand-propelled overhead Cleveland Tramrail carriers. An electric hoist raises and lowers the distributing ladle. A lever arrangement changes the elevation of the pouring ladle.

T-4136
The molds are poured on the mold conveyor as they pass this station. Although pouring continues all day long at a rapid rate, there is no running helter-skelter or inefficient steps, because molds and metal are brought together here by efficient conveying methods.



Layout of Cleveland Tramrail System

CASTING PRODUCTION



T-4132
View of overhead rail system serving the two mold conveyors in new foundry section. This is only a part of the extensive Cleveland Tramrail system in this modern foundry

For Tops in Production, Study This Clean, Orderly, Efficient Layout

For the production of small and medium castings, a combination of Cleveland Tramrail equipment and continuous mold conveyors is providing outstanding advantages for an Eastern foundry. Top efficiency is obtained and confusion and lost time reduced to a minimum.

There are four continuous mold conveyors which travel through the molding departments where the molds are received directly from the molding machines. Each conveyor has one man whose sole task is to pour the molds. A second man shifts the weights.

40 tons of grey iron are poured per 9-hour day. The metal is conveyed from the furnace to the pouring stations by the overhead Cleveland Tramrail system. One distributing ladle with operator is required to supply each mold conveyor where the metal is transferred to the small pouring ladles which also ride on tramrail carriers.

This is a high speed production foundry. It is clean and orderly and every detail systematized. Each man has a specific job. Because of the modern facilities provided he handles his work with ease and dispatch. His every step has been carefully planned for maximum efficiency and he cannot deviate from the routine established.

The mold conveyors set the production pace. This is slow enough so that the pourer can fill all molds and have sufficient time to refill his ladle. If for any reason the conveyor is moving too fast, it can be stopped temporarily.

Cleveland Tramrail equipment was originally installed in 1928 to serve the first two continuous mold conveyors put into operation. Because of its satisfactory performance Cleveland Tramrail was again chosen to serve two additional conveyors when installed in 1941.

CLEVELAND TRAMRAIL

THE CLEVELAND CRANE & ENGINEERING CO.
3803 East 286th St. WICKLIFFE, OHIO.

A New Addition to the Payloader Line

HOUGH

"HUFF" MODEL

¾ YARD

HF

NEW IN DESIGN

NEW IN CONSTRUCTION

NEW IN PERFORMANCE

HYDRAULIC DUMP CONTROL

Loads can be dumped gradually or completely — at any height — and the bucket relatched by hydraulic power.

New in every detail, packed with labor saving, time saving, money saving features, the sturdy Model HF is setting new standards of performance in excavating, loading, carrying and dumping sand, clay, earth, chemicals, fertilizer, coal or any bulk material. Equipped with an entirely new, fully reversible 4 speed transmission, the Model HF combines practical loading speeds with high reverse maneuvering speeds, instantly available with a minimum of shifting. Hydraulic dump control, tip-back bucket, proper balance, single lever control and complete visibility, all contribute to the superior performance of the Model HF.

Hough Payloaders incorporate over 25 years of material handling engineering experience and are now available in 3 practical sizes — the 10½ cu. ft. Model HA; the NEW ¾ yard Model HF; and the big 1 yd. Model HL. Send for complete details today.

THE FRANK G. HOUGH CO.

MATERIAL HANDLING EQUIPMENT SINCE 1920

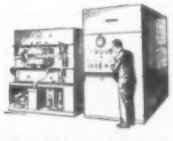
705 Sunnyside Ave. **Libertyville, Ill.**

"This Brass Casting Shakeout Eliminated a Bottleneck For Us!"

HAND CLEANING OF BRASS CASTINGS was a slow, unprofitable method for this large midwestern brass foundry. To step-up production, Allis-Chalmers recommended its 3′ x 8′ "Aero-Vibe" 2-bearing shakeout, employing a special alloy deck. This arrangement now handles the entire output of the molding floor.

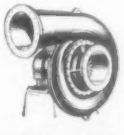
Complete flexibility of application is obtained through a six-position amplitude control and deck slope adjustment and casting pile-ups are prevented by a two foot sloping section of deck at feed end. Small and medium size soft brass castings are satisfactorily cleaned without marking or scuffing. For further information call your nearby A-C Office. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2241

A-C Builds Basic Machines, Blowers, Pumps, Drives, Electrical Equipment For Foundries!



22,000,000 V BETATRON

cuts X-Ray time from hours to minutes. Actually X-rays through 13 inch forging in one minute . . . through 20 inches of steel in 20 minutes!



CUPOLA BLOWERS

Available in all practical sizes. A-C centrifugal blowers can be equipped with air weight control for better cupola economy. Bulletin 1686048A.

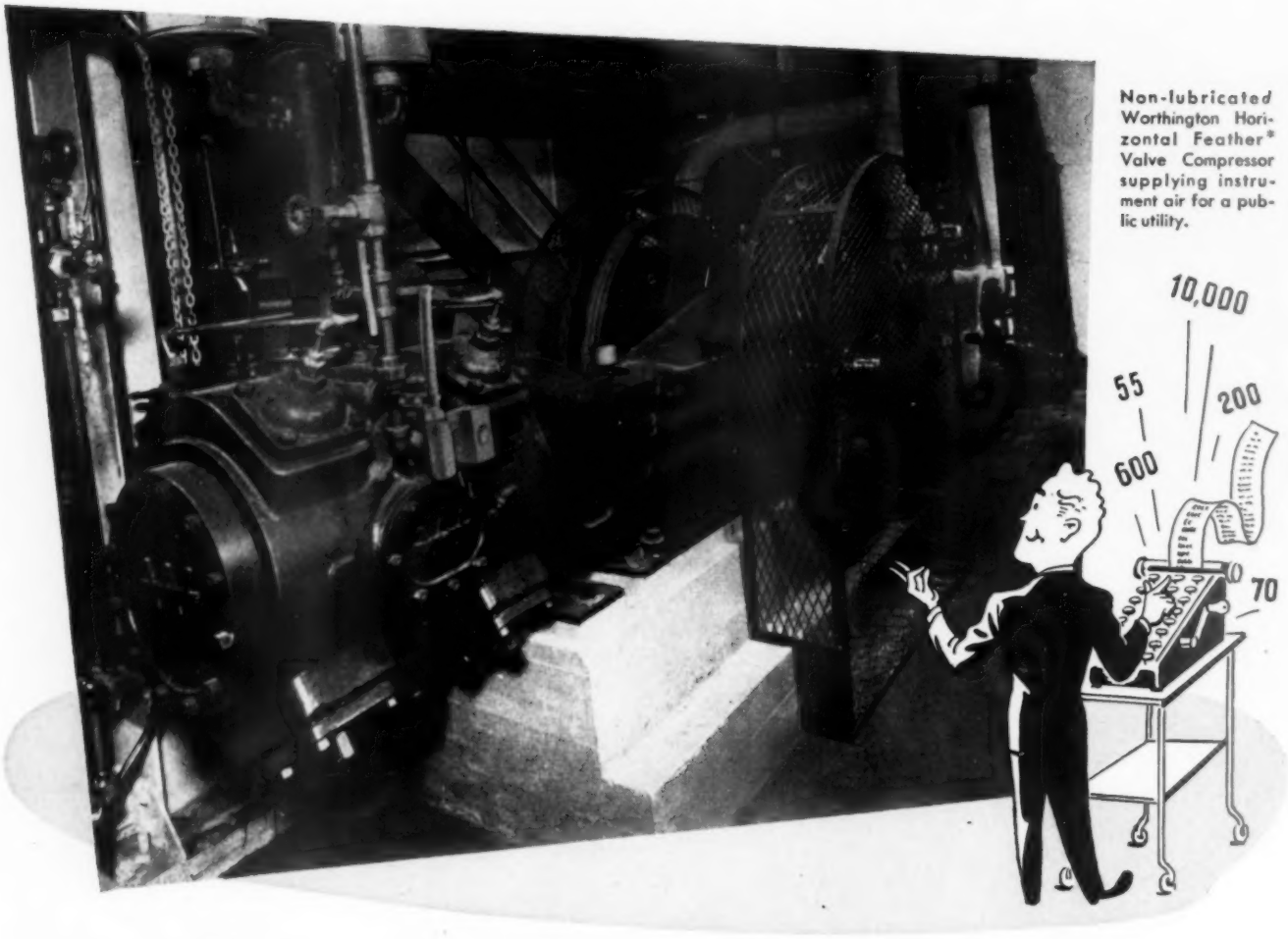
SEND FOR NEW BULLETIN

0786092A, "Foundry Mechanization"—it's packed with helpful, usable information on the entire Allis-Chalmers line of Foundry equipment.

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great



Non-lubricated Worthington Horizontal Feather* Valve Compressor supplying instrument air for a public utility.

Piston Displacement

UP TO 1,044,367,200 C. F. Y.

(1,047,228,480 Cu. Ft. Each Leap Year)

Maybe it's a bit on the optimistic side to claim that a Worthington Single Horizontal Compressor, Type HB, will keep going 24 hours a day, 365 days a year. But, the more you look into this line of 29 rugged machines (ranging in size from 5" x 5" to 26" x 13"), the more clearly you'll see that everything about them adds up to continuous, heavy-duty operation . . . year after year.

WRITE FOR BULLETIN L-640-B1A

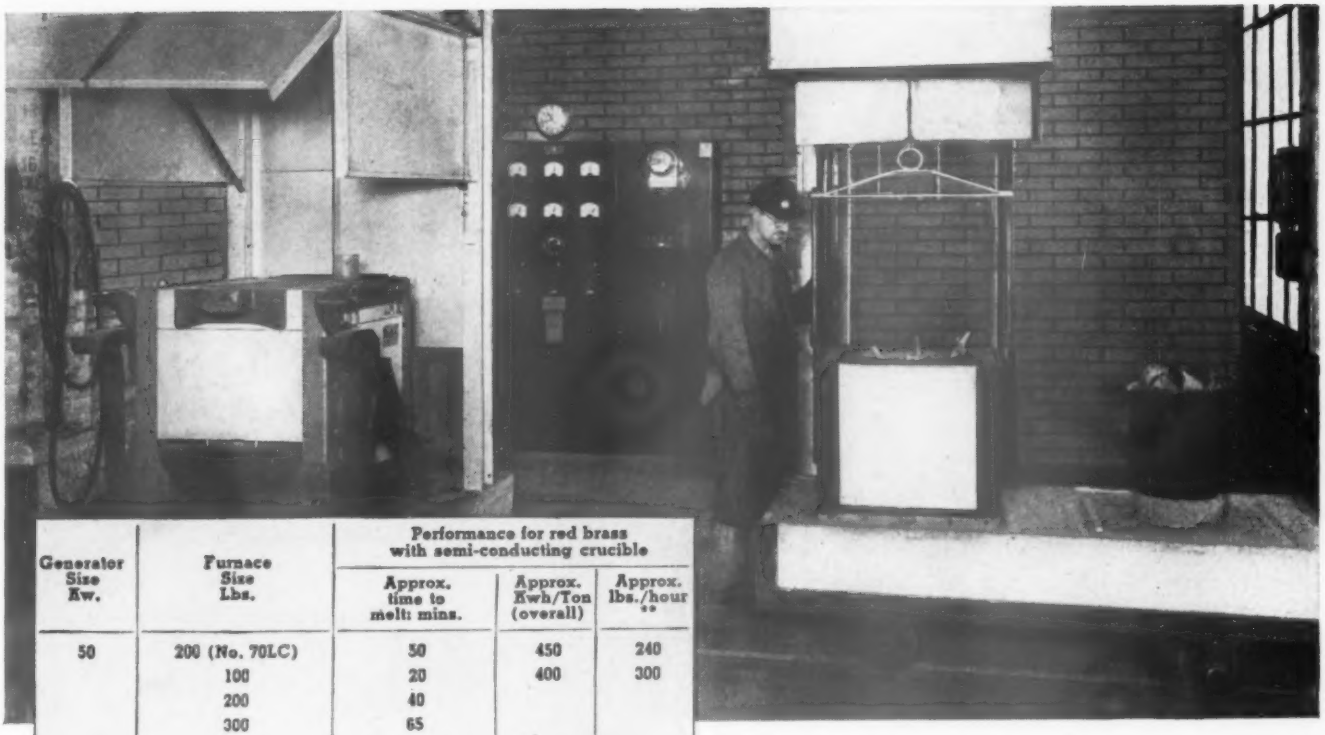
If getting low-cost air is your responsibility, you'll want to look into the 24 pages of this bulletin. Write for it today and learn why — in compressors, as in so much other equipment — *there's more worth in Worthington. Worthington Pump and Machinery Corporation, Compressor Division, Buffalo, New York.*

*Reg. U.S. Pat. Off.

WORTHINGTON

K7.4

NO OTHER COMPRESSOR WILL OUTPERFORM A WORTHINGTON



Generator Size Kw.	Furnace Size Lbs.	Performance for red brass with semi-conducting crucible		
		Approx. time to melt: mins.	Approx. Kwh/Ton (overall)	Approx. lbs./hour **
50	200 (No. 70LC)	50	450	240
	100	20	400	300
	200	40		
	300	65		
	450	100		
100	200 (No. 70LC)	20	450	550
	200	22	400	600
	300	32		
	450	45		
	600	60		
	1000	110		
175	200 (No. 70LC)	15	400	800
	450	25	385	1100
	600	33		
	1000	60		
250	450	17	375	1500
	600	23		
	1000	40		

**No allowance for "down" time to pour or charge

SPEED ELIMINATES COSTLY WASTE

With high speeds shown in the table above, and controlled temperature melting, Ajax-Northrup furnaces show very little loss of easily oxidizable elements. Oftentimes the savings in alloying constituents alone makes Ajax-Northrup the most economical melting method.

AJAX-NORTHRUP MELTING AND HEATING

SEND FOR BULLETIN 27

It suggests hundreds of ways you can save with Ajax-Northrup high frequency for melting; heating for forging, brazing, hardening, etc.

HOW'S THIS FOR *Control*

IN BRASS MELTING

Its high speed—200 lbs. of brass melted in 22 minutes by this 100 kw. Ajax-Northrup lift coil furnace—means there's little chance for oxidation and no contamination. It hits exact pouring temperatures easily, and stirs as it melts. Even tough to control melts, such as high tin bronzes, high lead bearing alloys, aluminum bronzes, magnesium, and alloys for precision casting are made easy with Ajax-Northrup furnaces. And you can change alloys simply by changing crucibles with the lift-coil unit. The crucible is picked up in a shank for pouring.

FOR STEEL MELTING, TOO

The tilting coil furnace with built-in crucible, melts 500 lbs. brass in about 50 min., but you can line it for steel to melt 500 lbs. in less than two hours. It's flexible—plan on several sizes and linings for furnaces to handle all metals on short notice.

107

AJAX NORTHRUP SINCE 1916

AJAX ELECTROTHERMIC CORP.
AJAX PARK, TRENTON 5, N. J.

ASSOCIATE COMPANIES
AJAX METAL COMPANY • AJAX ELECTRIC CO., INC.
AJAX ELECTRIC FURNACE CORP. • AJAX ENGINEERING CORP.

HIGH-FREQUENCY HEATING-MELTING

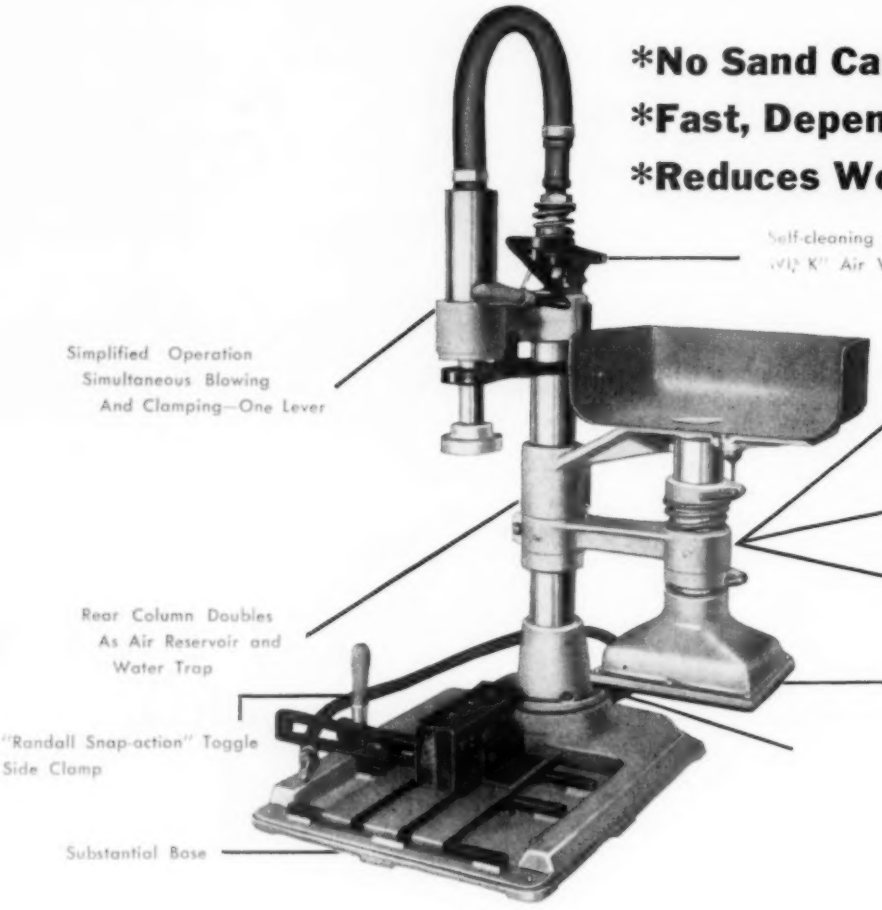
NEW RANDALL CORE BLOWER

With CONVERTIBLE, SWING-TYPE HEAD

***No Sand Cartridges**

***Fast, Dependable**

***Reduces Work Fatigue**


Self-cleaning "QUICK-AS-A-WINK" Air Valves
Swing-Type Head, Permitting the Blowing of Multiple Boxes Without Refilling
Simplified Operation Simultaneous Blowing And Clamping—One Lever
Blow-head Capacity of 13 Pounds of Core Sand
Convertible Blow-head With 360-degree Turning Radius Adaptable to Core Boxes of All Shapes
Rear Column Doubles As Air Reservoir and Water Trap
"Randall Rapid-change Plate," 10½" by 9" With 9½" by 7" Blowing Surface
"Randall Snap-action" Toggle Side Clamp
1-inch Air Inlet
Substantial Base

A single motion of the left hand clamps the core box in place, a single motion of the right hand simultaneously clamps the head and blows the cores. *It's as simple as that* with the new RANDALL CORE BLOWER, the latest contribution to the modernization of the foundry industry.

Quality cores are produced fast by the RANDALL, and in any business *speed plus quality means economy, and economy means profits . . . .*

But the superiority of the RANDALL isn't limited to the actual core-blowing operation alone. Its *swing-type head*, possessing a sand capacity of 13 pounds, dispenses with sand cartridges and the costs and extra motions they involve, at the same time permitting the blowing of multiple cores without refilling. The *360-degree turning radius* of the head makes the machine readily adaptable to core boxes of all shapes.

The many other features of the RANDALL include the RANDALL RAPID-CHANGE PLATE, measuring 10½ x 9" and boasting a blowing surface of 9½ x 7"; the RANDALL SNAP-ACTION TOGGLE SIDE CLAMP; an ability to conserve air; and, above all, unquestionable reliability.

All of these features combine with many more to make the RANDALL CORE BLOWER the efficient core-making unit it is, and promise foundrymen real relief from outmoded and expensive core-making methods. And the RANDALL CORE BLOWER can be depended upon to maintain such a standard of service for years.

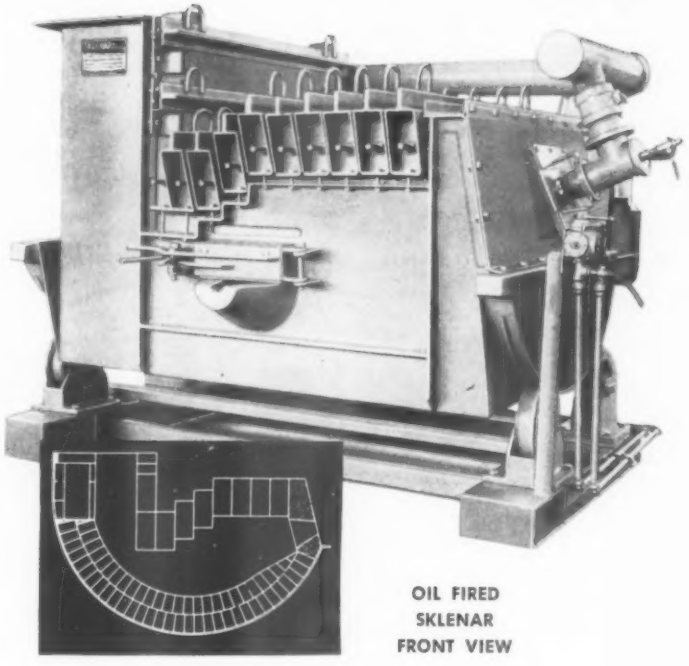
WRITE FOR FREE COPY OF DESCRIPTIVE LITERATURE

Randall
"DESIGNED TO PRODUCE"

BLOW MACHINE COMES COMPLETE WITH CLAMP

THE RANDALL CORPORATION, Newburgh Station, Cleveland 5, Ohio

Proved Performance!



OIL FIRED
SKLENAR
FRONT VIEW

SKLENAR FURNACES

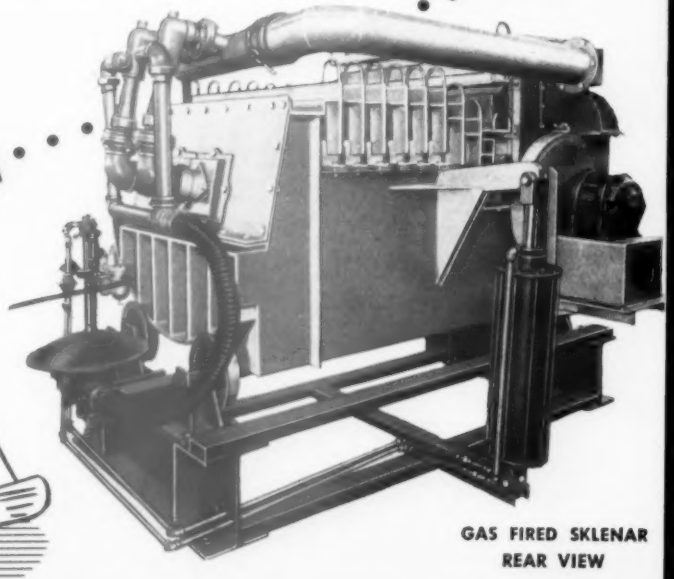
have proved their ability to melt metal better, faster and at decided savings. Many leading foundries, the country over are placing orders for additional Sklenars . . . some after only several test runs . . . others after many months of hard pounding. Yes, Sklenar Furnaces are the last word in modern melting furnaces. They handle GREY IRON, BRASS, ALUMINUM or FERRO-MANGANESE with equal efficiency.

Sklenar Furnaces are of the Direct Fired Reverberatory Type, and their design is unique. Metal is charged into a hopper which is also an exhaust from the combustion chamber. Here metal is preheated and melted at the throat of the hopper. Cold metal does not reach the molten bath. It is easy to charge with either returns from the molds or ingots. Metal is in no way injured by the direct fire. There are no crucibles or iron pots to contend with.

Sklenar Furnaces are tilted pneumatically or manually according to capacity. They are made in five sizes, with a brass capacity of 400, 600, 800, 1200 and 2000 lbs. . . . sizes up to 10,000 lbs. are on the drawing boards. They are delivered complete with blower and recuperator for preheating air for combustion. Choice of Gas or Oil Fire.

Sklenar Furnaces are by far the fastest melting and most economical furnaces ever offered the foundry industry. Check your fuel costs . . . melting time . . . maintenance costs . . . labor costs . . . working conditions and quality of product. Then compare with Sklenar Furnaces. Your findings will astound you. Investigate their efficient operation in foundries, permanent mold and die casting plants at once. Send for complete literature today.

Consult Stroman engineers for an unbiased opinion on the type of metal melting furnace equipment most suitable for your needs. The Stroman Furnace & Engineering Company manufactures a complete line of metal melting furnaces . . . reverberatory . . . crucible . . . and iron pot, and are in no way limited in product manufacture to suggest the most suitable and efficient furnaces for your plant.



GAS FIRED SKLENAR
REAR VIEW

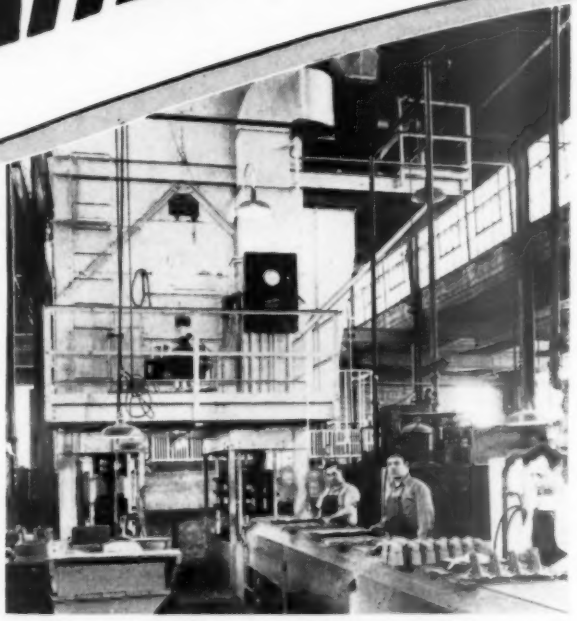
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

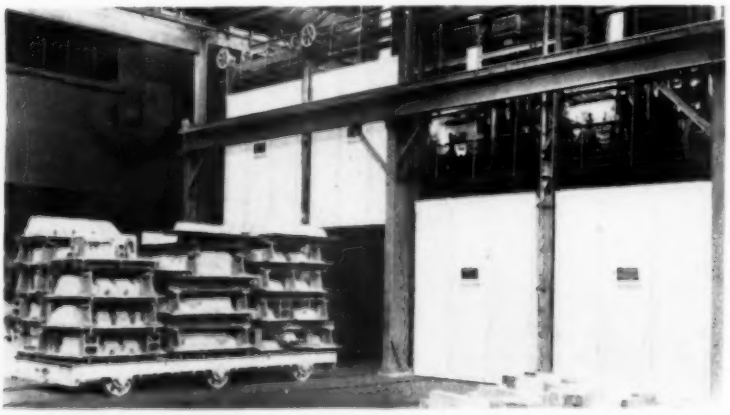
THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

COLEMAN OVENS AHEAD FOR

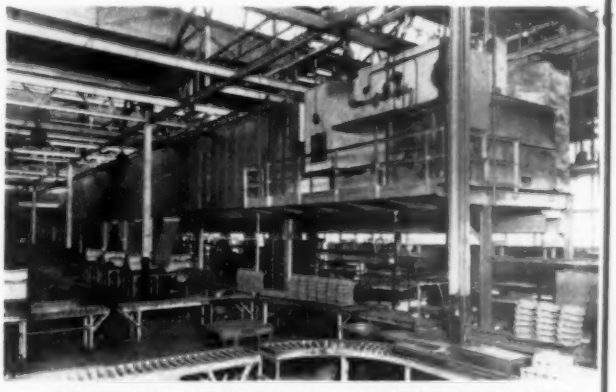
COLEMAN TRANSRACK OVENS. For operation with portable racks to reduce handling. Single or double rack capacity per compartment.



COLEMAN TOWER OVENS. For high speed production at lowest labor cost Patented Open Center permits loading from inside and outside the Tower to provide greater accessibility and loading speed.



COLEMAN CAR TYPE OVENS. For baking large cores or drying molds. Most of the large core and mold ovens in operation in every class of foundry production are Coleman Car Type Ovens.



COLEMAN HORIZONTAL OVERHEAD CONVEYOR OVENS. For production foundries, to serve large numbers of coremakers for specialized conditions.

COLEMAN CORE and MOLD OVENS

The **FOUNDRY E**

CLEVELAND 13, O

BUILDERS OF COLEMAN

OVER 40 YEARS

The Widest Range of Foundry Ovens Built by World's Oldest and Largest Foundry Oven Specialists

AHEAD—IN DEPENDABLE BAKING. Coleman Ovens eliminate the uncertainties in core baking and mold drying — protect you against rejects and make-overs.

AHEAD—IN LABOR SAVING. Efficient and modern mechanical designs reduce handling and other indirect labor to a mere fraction.

AHEAD—IN HEAVY DUTY CONSTRUCTION. Long dependable service assured under the most severe operating conditions with minimum labor for maintenance.

AHEAD—IN KNOW-HOW. Experience gained from more than 9,000 successful installations of all types covering every class of foundry work — gray iron, malleable, steel, alloy, magnesium, etc.

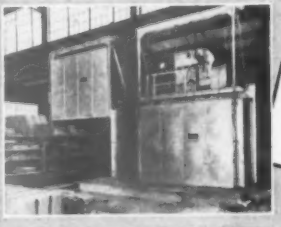
AHEAD—IN FUEL ECONOMY. Coleman Ovens can be furnished with a heating system to use whichever fuel is most economically obtainable in your district — gas, oil, electricity, stoker or powdered coal, etc.

Write for Folio of Bulletins

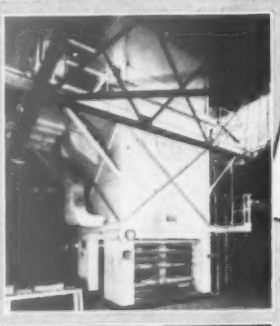
COLEMAN Portable Core Ovens

COLEMAN Rolling Drawer Ovens

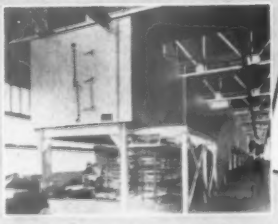
COLEMAN Transrack Ovens



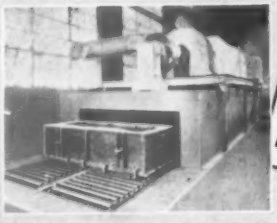
COLEMAN Car Type Ovens



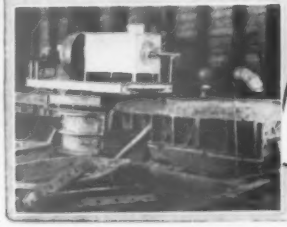
COLEMAN Tower Ovens



COLEMAN Horizontal Conveyor Ovens



COLEMAN Conveyor Mold Ovens



COLEMAN Portable Mold Dryers

RY EQUIPMENT *Company*

D 13, OHIO, U. S. A.

AN AND SWARTWOUT OVENS

MEMBER

what's your N-F I.Q.

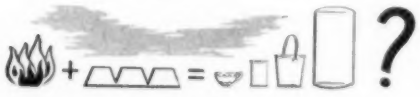
...non-ferrous know-how, that is...

Here's another Federated first . . . a batch of foundry teasers to test your mettle

1 ***Which requires the most heat to melt?***
(a) Aluminum (c) Butter
(b) Copper (d) Lead

2 ***The best atmosphere for melting brass is:***
(a) Slightly reducing
(b) Neutral
(c) Humid
(d) Slightly oxidizing

3 ***About how much water vapor is produced as a product of combustion when melting 1000 lbs. of 85/5/5/5 in a gas furnace?***
(a) 1 pt. (c) 86 gals.
(b) 1½ qts. (d) 11 gals.



4 ***The best guide to the right temperature of the metal in the furnace is:***
(a) The color of the metal
(b) A pyrometer
(c) A double-action thermostat
(d) The B.t.u. input

5 ***The most common cause of defects in copper alloy castings is:***
(a) Wet sand
(b) Dendritic structure
(c) Gas absorption
(d) Low pouring temperature

6 ***What is Di-METAL?***
(a) A 50-50 copper-tin alloy
(b) An alloy for casting caskets
(c) A brand name for certain Federated zinc base alloys
(d) A lead base alloy

7 ***What is a satisfactory method of removing slag from the tip of a pyrometer?***
(a) Hit it with a hammer
(b) Wipe it with a steel-wire brush while hot
(c) Dip it in water
(d) Sandpaper it off

8 ***When should phosphor copper be added to tin bronze melts?***
(a) With the ingot
(b) Just before casting
(c) Just as metal melts
(d) 20 minutes before pouring

9 ***Which of the following specifications indicates the alloy of composition: Cu—4%, Si—3%, Mg—0%?***
(a) F430 (c) AN-A-4
(b) QQA601 (d) S.A.E. 326

Federated METALS DIVISION
AMERICAN SMELTING AND REFINING COMPANY

Federated first in the non ferrous field FMD

10 *How much silver is there in a nickel silver alloy?*

(a) 18%
(b) 0%
(c) 2%
(d) 62%

11 *What alloy of aluminum shows the best heat-treated properties?*

(a) F720
(b) F410
(c) F024
(d) F1020

12 *The best castings come from the foundry that uses:*

(a) Bathing beauty calendars
(b) Fluorescent lighting
(c) New furnace linings every week
(d) Federated ingots

"DOC TILLITY" says:

Here are the answers

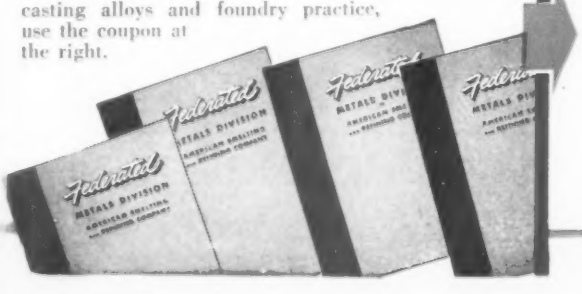
1 Aluminum, because of its high specific heat.
2 Slightly oxidizing.
3 11 gals.
4 A pyrometer.
5 Gas absorption, which leads to porosity.
6 A brand name for certain Federated zinc base alloys.
7 Wipe it with a steel-wire brush while hot.
8 Just before casting.
9 All of them, but the Federated specification number — F430 — tells you the composition at a glance.
10 0%—the name refers to color rather than composition.
11 F410.
12 Federated ingots, of course.

HOW TO RATE YOUR SCORE

Up to three wrong, you're a top-flight foundryman! Four to seven wrong, you ought to refresh your memory a bit.

If your score showed eight or more wrong, you can profitably invest some of your time chatting with a friendly Federated service man or reading Federated's helpful literature. Just call or write any of Federated's 11 plants or 25 sales offices from coast to coast or *Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, New York.*

For additional copies of this quiz, or for useful literature about non-ferrous casting alloys and foundry practice, use the coupon at the right.



FEDERATED METALS DIVISION Dept. F JMLco-F-FI
American Smelting and Refining Company
120 Broadway, New York 5, New York

Please send me the items I have checked:

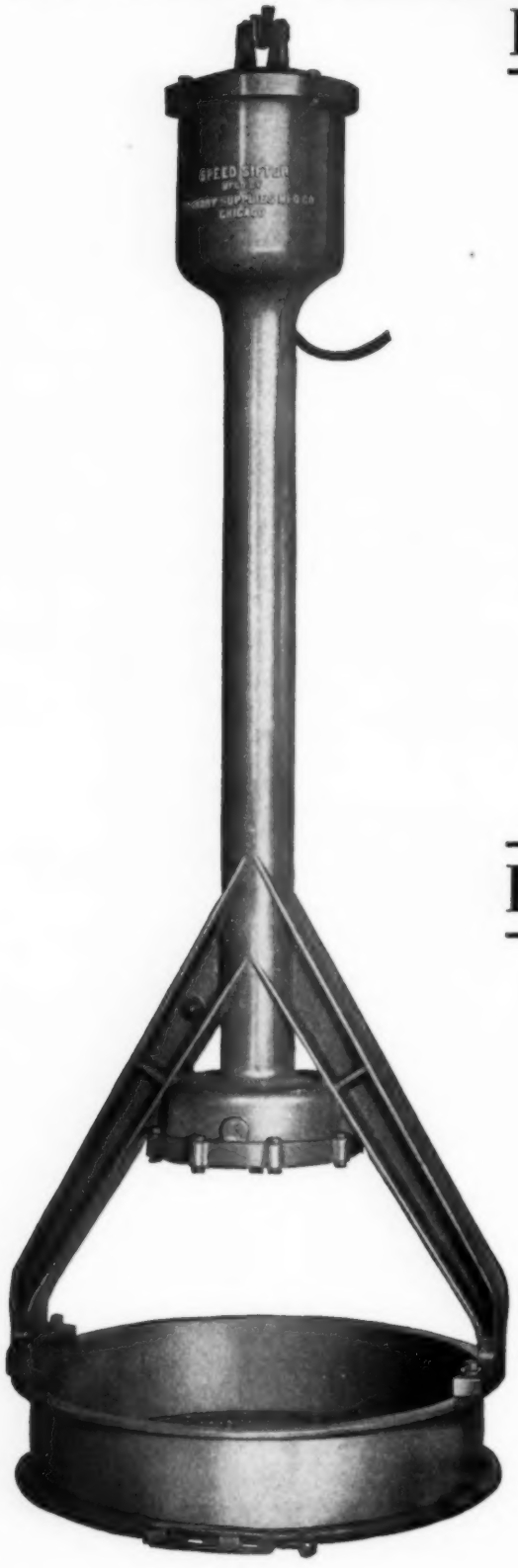
☐ Non-Ferrous Metals and Alloys booklet
☐ Aluminum Casting Alloys booklet
☐ Test Bars booklet
☐ Reprints of technical articles
☐ Reprint of this quiz

Company Name .....
Address .....
Signature .....

Increase Production

with the

ROTOPLANE SPEED SIFTER ★ RED ELECTRIC VIBRATORS



ROTOPLANE SPEED SIFTER

The ROTOPLANE Speed Sifter is an *improved* sand riddle of much greater capacity and much longer life. One size and type serves all purposes in the foundry — does *all* your sifting more quickly and economically.

It is easily handled by one man, weighs approx. 90 lbs., is 62 in. high overall. The one-piece frame of tough aluminum alloy makes for a remarkably effective vibration. Its smooth, free, rotary action vastly increases bearing life; all bearings grease packed. All mechanism of the ROTOPLANE is *completely* enclosed—no bearings or activating parts of any kind exposed to dust and grit.

The Quick-Change Sieves are instantly interchangeable, mounted in smooth, flat steel ferrule, with 20-inch diameter clear sifting area. No jagged edges to tear workers' hands, no storage problem.

$210.00 f. o. b. Chicago — complete with cable, safety ground wire. Standard 1/3 h. p. motor, 110 volt, 60 cycle, single phase.

UNIVERSAL FREE-WHEELING model equipped with motor as above $195.00

RED ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$12.00
No. 2—Medium match plate work	15.60
No. 5—Heavy match plate, tub and bench work	20.40
No. 9—Machine and heavier work	28.80

Third (ground) wire per U. S. Govt. code—furnished with No. 9 at no extra cost; $1.20 extra with Nos. 1, 2 and 5 vibrators.

KNEE SWITCHES for operating Red Electric Vibrators: Single pole $3.60, Double pole $4.80.

FOUNDRY SUPPLIES MANUFACTURING CO.

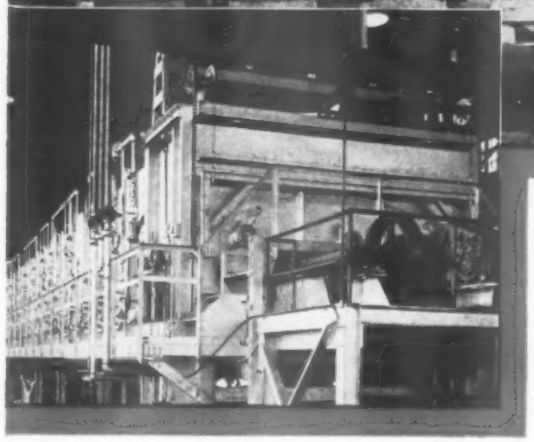
2221 Orchard Street **Chicago, Illinois**

CABLE ADDRESS: "ROTOPLANE CHICAGO"

B&W REFRACTORIES

show long life in 30% CO Atmosphere

Excellent Performance leads to Repeat Orders



Photos courtesy of Swindell-Dressler Corp.

In a continuous malleableizing furnace, temperatures above 1750°F. and atmospheres up to 30% *carbon monoxide* caused competitive insulating firebrick and first quality firebrick to disintegrate rapidly. They were replaced, early in 1941, with B&W Refractories—B&W 80's for the piers, B&W Insulating Firebrick for the furnace lining. These B&W Refractories are giving such satisfactory service that — when this company recently built 3 new furnaces — B&W Refractories were specified throughout!

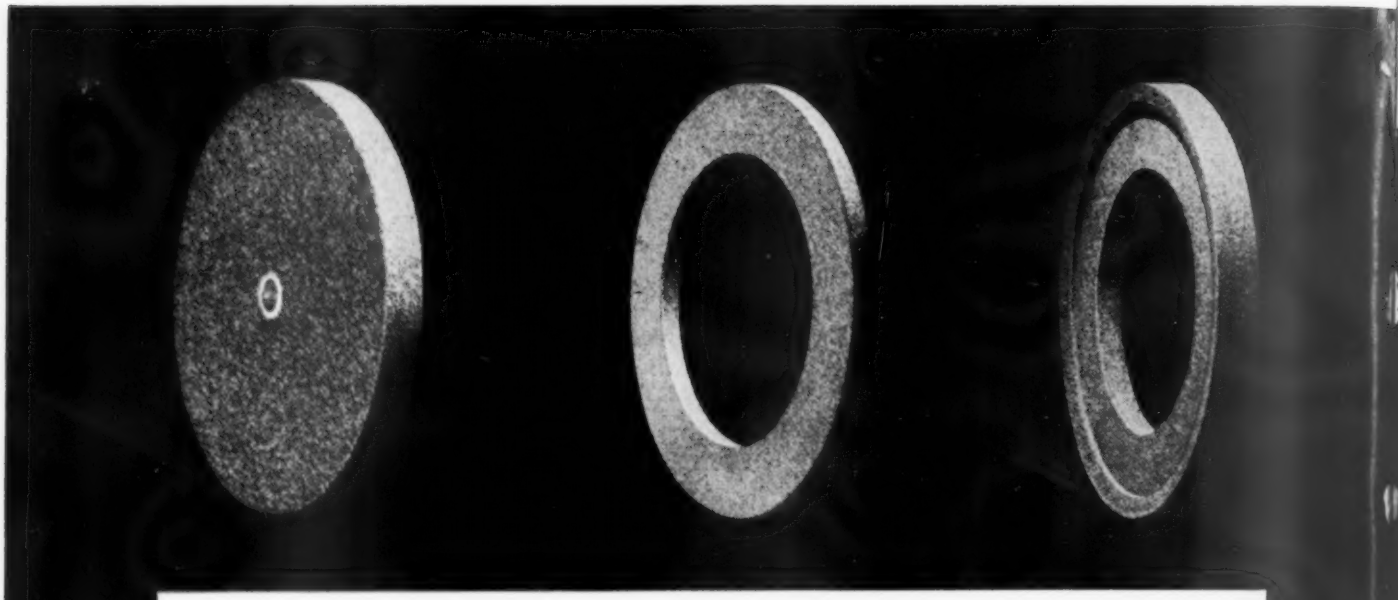
B&W Refractories are helping to lower operating costs in all types of furnaces. Your local B&W Refractories Engineer will gladly explain how B&W Refractories can benefit you.

R-288

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.



Production really rolls with job-designed wheels

Are you interested in speeding up production—in smoothing the rough edges on your grinding bill?

Then consider your grinding wheels. Production really rolls when you use the *right* wheels. But production creeps and falters when you use *wrong* ones. And it all shows up on the records.

For 58 years, men in your industry have been getting the right wheels and faster production by consulting Peninsular.

Call in Peninsular engineers on your job. They will study your grinding thoroughly. From this study, they will develop job-designed grinding wheels for best possible results at lowest possible costs. *Every* Peninsular grinding wheel is specially made for its particular job.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

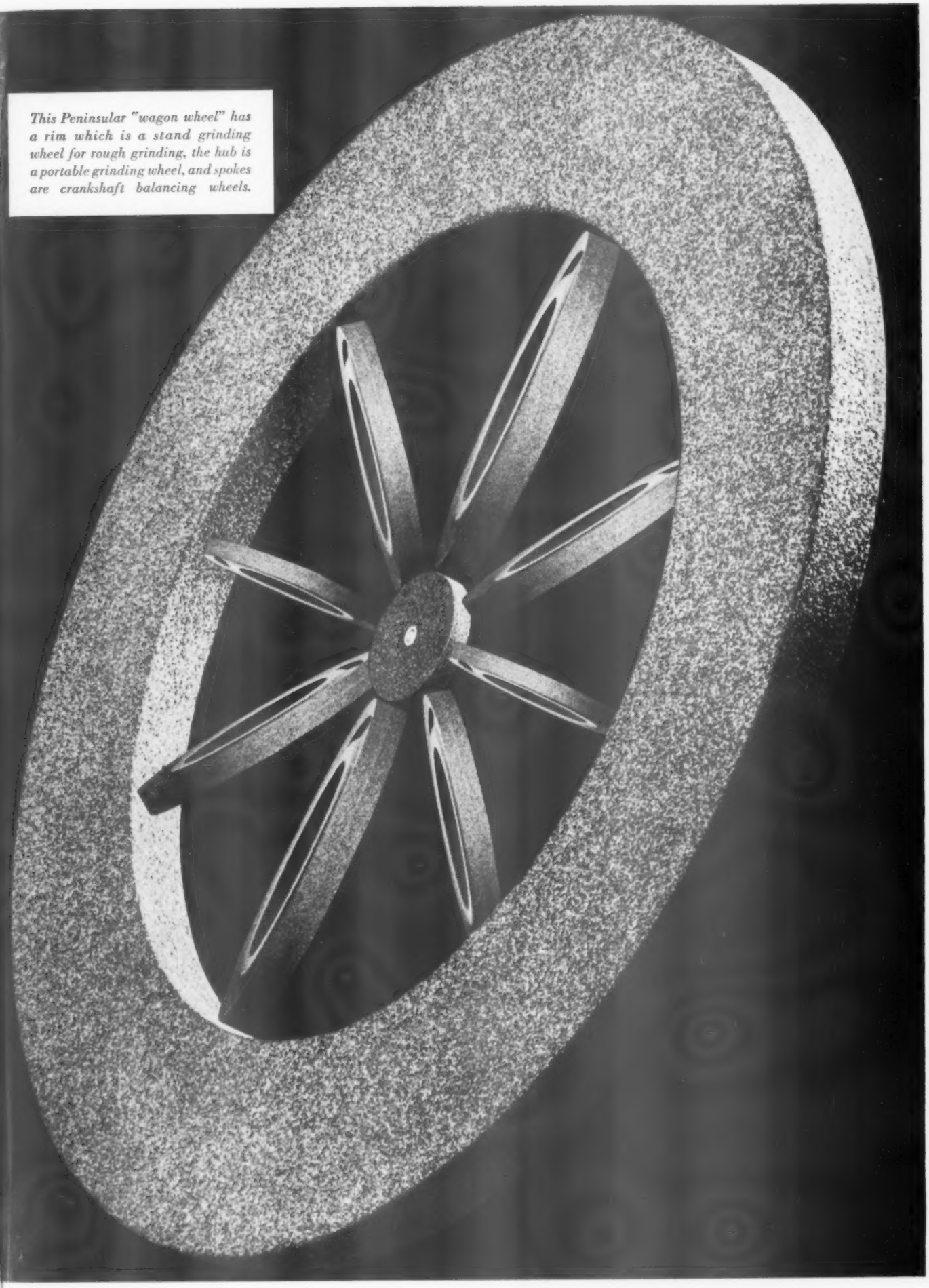
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

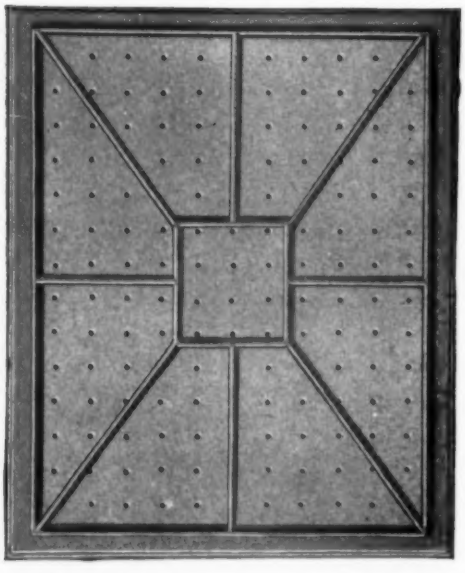
SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS



This Peninsular "wagon wheel" has a rim which is a stand grinding wheel for rough grinding, the hub is a portable grinding wheel, and spokes are crankshaft balancing wheels.

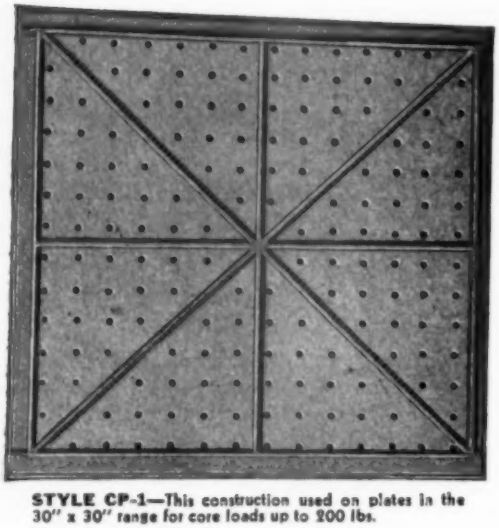
DIAMOND CUSTOM-BUILT
CORE PLATES



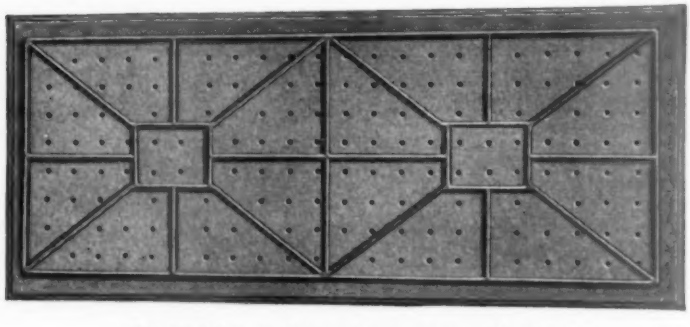
STYLE CP-3—This type reinforcing on "square" plates for loads up to 1200 lbs. Typical sizes run 40" x 50" and 36" x 60".

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!

Less baking time with Diamond Plates . . . because sturdy construction with light weight is achieved. They heat up and cool more quickly. Fabricated from ½" or heavier plate as indicated to meet load requirements, users acclaim the long-life and uniform quality of Diamond Plates. Available in special and standard sizes to suit your exact requirements.



STYLE CP-1—This construction used on plates in the 30" x 30" range for core loads up to 200 lbs.



STYLE CP-2—For long and narrow cores and loads to the 1200 lb. range. Note web-bracing construction.

HOW TO ORDER DIAMOND CORE PLATES

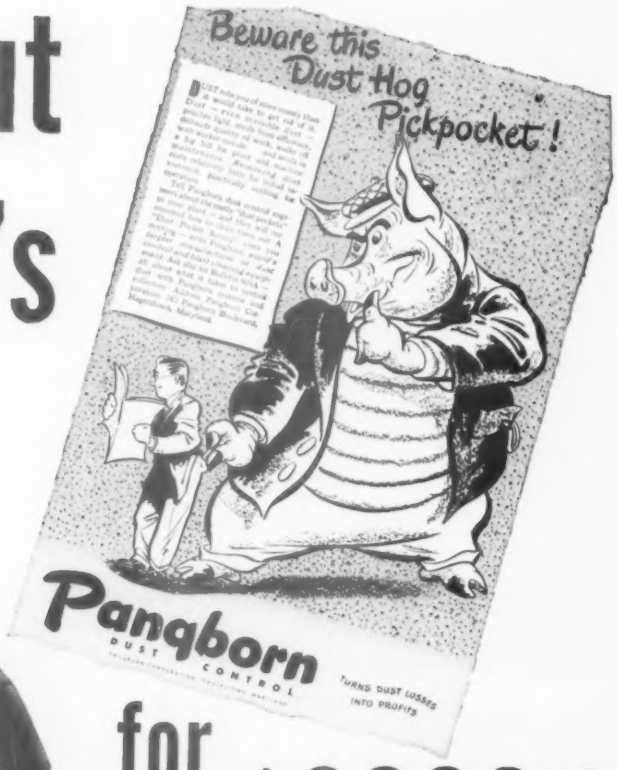
Since we recommend "job fitted" plates for real production efficiency, we suggest your telling us *how heavy your core loads will be* and the *approximate overall plate size*. We will design reinforcing accordingly, and quote in terms of plates best suited to your needs.

DIAMOND

Telephone 2553 **CLAMP AND FLASK COMPANY** Richmond, Indiana

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

...We Shook Out the Pickpocket's Dust Pockets



for $6000.00

and more

In the plant shown here, 25 tons of dust a day, produced from woodworking operations, could have formed dust pockets which would have ruined efficiency as well as created a hazard.

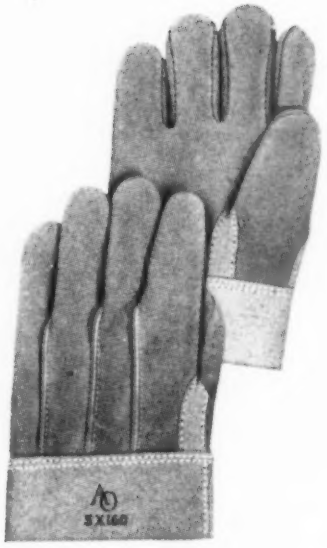
But — a Pangborn dust control system was installed to collect and dispose of the dust. As a result, the shop area "is remarkably clean and clear of dust". The wood waste, removed from the air, is deposited directly into storage hoppers for disposal. And, the air, after cleaning, *returns* to the working area, resulting in a saving in heating expense alone of about $6,000.00 a year.

A "Dust Pocket Survey" of *your* plant may reveal similar opportunities to turn dust losses into profits by removing dust (and *reclaiming* it, if it's valuable) from light-stealing, efficiency-reducing, maintenance-increasing dust pockets. Such a survey — by experienced Pangborn engineers — costs nothing. And ask for free 28-page Bulletin 909A, giving complete story on Pangborn equipment which has successfully solved dust problems in over 9000 installations. Address Pangborn, *world's largest manufacturer of dust control and blast cleaning equipment* at 300 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn
DUST CONTROL
PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

TURNS DUST LOSSES INTO PROFITS

in Safety Clothing means Protection with Comfort ...from Head to Toe



AO 5X160 ALL-PURPOSE GLOVE. You don't have to handle jobs with "kid gloves" when wearing these tough chrome-tanned products of split horsehide. They will wear up to seven times longer than ordinary cotton gloves. All seams are securely stitched to prevent pulling or splitting. Clute pattern. Reinforced leather strap around thumb. Ideal for warehouse work and handling rough stock.

AO 4901 CL LEGGING — the chrome-tanned cowhide answer to heat, sparks and hot metal splashes. Comfortable and flexible — with complete protection for lower leg, ankle and instep. Easily adjusted at top and under instep by snap fasteners. *One swift motion releases immediately.* Available in leather, asbestos or flame-resisting duck.

AO 4X144 SLEEVELET — Safeguard arms against cuts, abrasions and heat. Chrome-tanned split cowhide. Seam is double cotton stitched, reinforced with steel stitching. Draw strap holds securely — easy slide buckle adjustment. Recommended for heavy grinding, die casting, bench welding.

AO 2142 CL APRON defies many common foundry hazards. Rugged chrome leather construction protects the body from chest to knee against sparks, splashes, cuts and abrasions met in operations as varied as tending blast furnaces and grinding. Regular or split leg. Size 24" x 42". Other AO aprons available in leather, asbestos or flame-resisting duck in five sizes.

American Optical COMPANY *Safety Division*

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IT'S NEW—IT'S SENSATIONAL

AMASTEEL

GENUINE ALLOY STEEL
SHOT & GRIT

LASTS MANY TIMES LONGER

Here at last is peak efficiency in Shot and Grit for blast CLEANING and PEENING. AMASTEEL SHOT and GRIT are far better than ordinary hard iron abrasives because they are TRUE ALLOY STEEL.

Compared to regular blasting materials, AMASTEEL offers an amazing superiority due to its long life and resistance to breakdown and greater CLEANING and PEENING speed. This feature means additional savings on labor, handling, storage, freight costs, and dust disposal.

AMASTEEL is produced under exclusive patents and is available in sizes that meet all CLEANING and PEENING requirements.

Investigate AMASTEEL Shot and Grit today.

PRODUCERS OF
PEENBLAST
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ALLOY METAL ABRASIVE CO.

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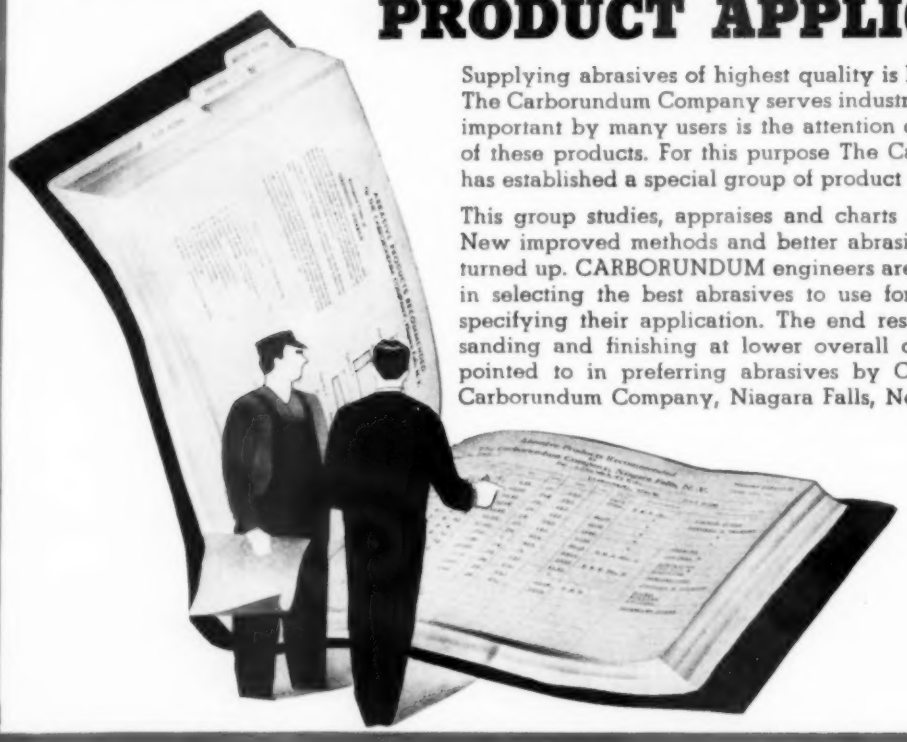
A BUYING GUIDE FOR ABRASIVES

POINT No. 5

PRODUCT APPLICATION



Supplying abrasives of highest quality is but one way in which The Carborundum Company serves industry. Considered equally important by many users is the attention directed to correct use of these products. For this purpose The Carborundum Company has established a special group of product application engineers.

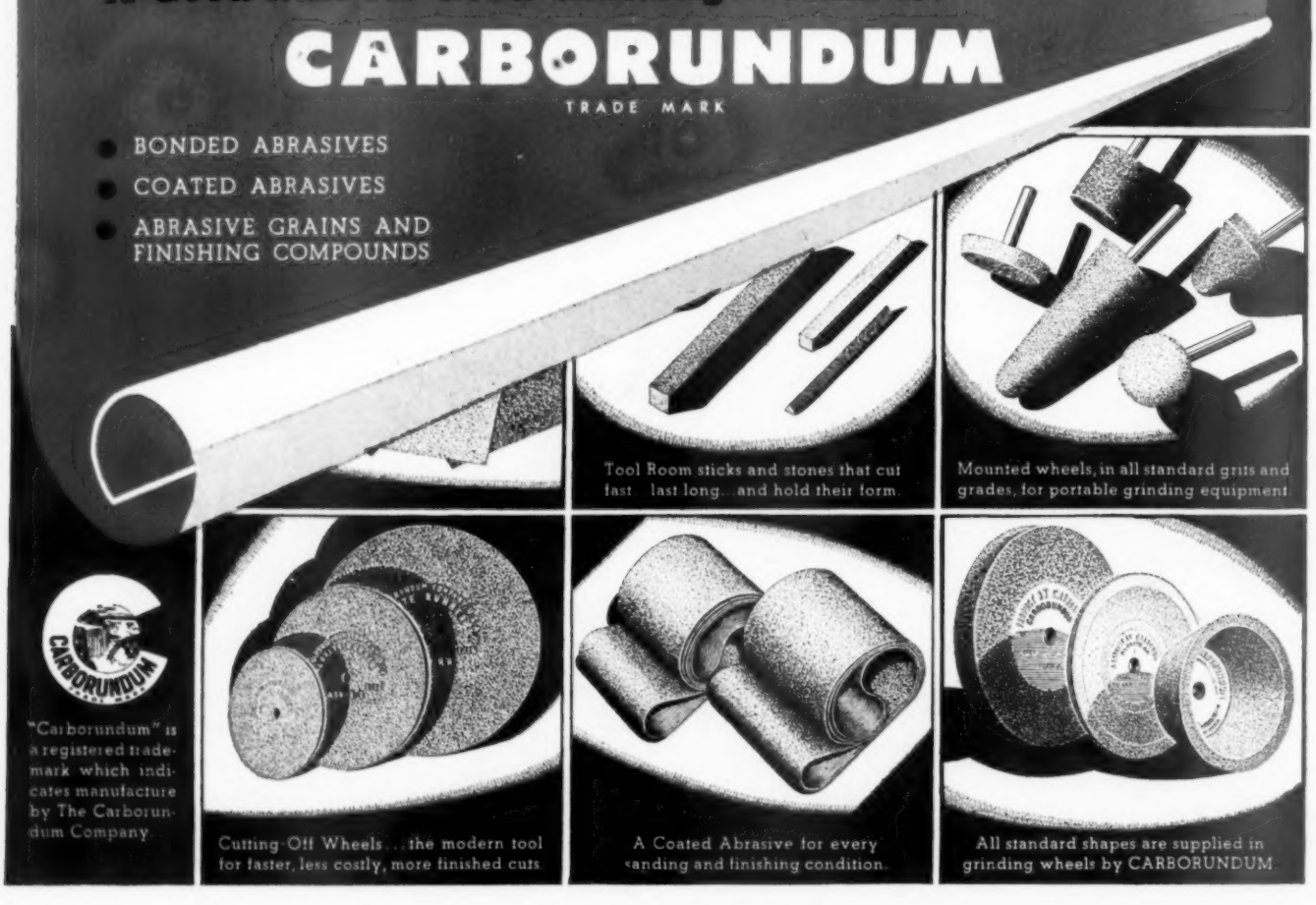
This group studies, appraises and charts abrasive applications. New improved methods and better abrasive products are often turned up. CARBORUNDUM engineers are also called in to help in selecting the best abrasives to use for specific jobs and in specifying their application. The end result is better grinding, sanding and finishing at lower overall cost... another reason pointed to in preferring abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM

TRADE MARK

- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS



Tool Room sticks and stones that cut fast... last long... and hold their form.

Mounted wheels, in all standard grits and grades, for portable grinding equipment.

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.

Cutting-Off Wheels... the modern tool for faster, less costly, more finished cuts

A Coated Abrasive for every sanding and finishing condition.

All standard shapes are supplied in grinding wheels by CARBORUNDUM.

GAS... flexible TOOL for Production-line Heat Processes

When you need heat for drying, for metal-melting, for process steam, for any of the production-line heating requirements you need GAS and modern Gas Equipment.

And for proof of the many successful applications of the productive flames of GAS in modern industrial practice you need only look at the experience records of A. C. Gilbert Company, famed producer of miniature trains, scientific toys, motor-driven appliances.

In its modern New Haven, Connecticut, plant the company's production engineers have applied GAS to heating processes such as:

- **Pre-melting furnaces for metal used in die-casting**
- **Molten-metal reservoirs of die-casting machines**
- **Remelt furnaces for reclaiming scrap metal**
- **Salt bath for gear hardening**
- **Boilers supplying steam for bakelite mold-heating**
- **Continuous cycle and convection drying and enameling ovens**

Some popular items in the list of A. C. Gilbert Company products

These varied examples demonstrate the applicability of GAS to the widest range of production-line processes. You can obtain full details on the use of GAS in modern productioneering by calling your local Gas Company.

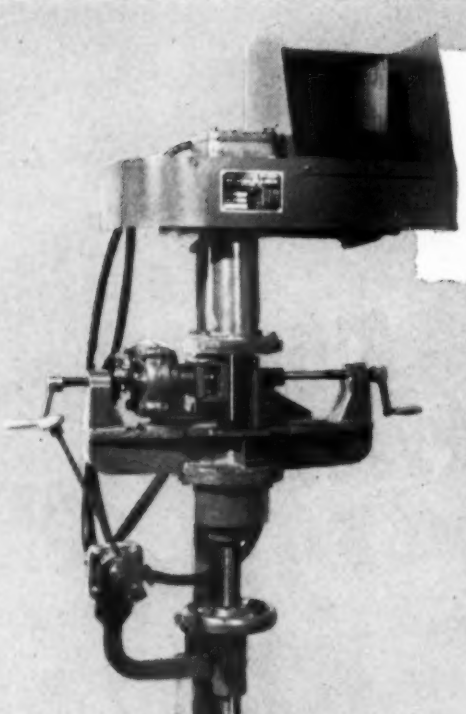
AMERICAN GAS ASSOCIATION

420 LEXINGTON AVE.
NEW YORK 17, N. Y.

Gas-fired traveling conveyor oven where Erector set parts are coated and dried

Automatic controls assure proper paint-drying temperatures in Gas convection ovens

Gas-fired boilers supply steam to the bakelite molding presses



POPULAR

The entire line of DEMMLER core blowing machines is popular because every DEMMLER core blower has proved itself a dependable, profitable investment.

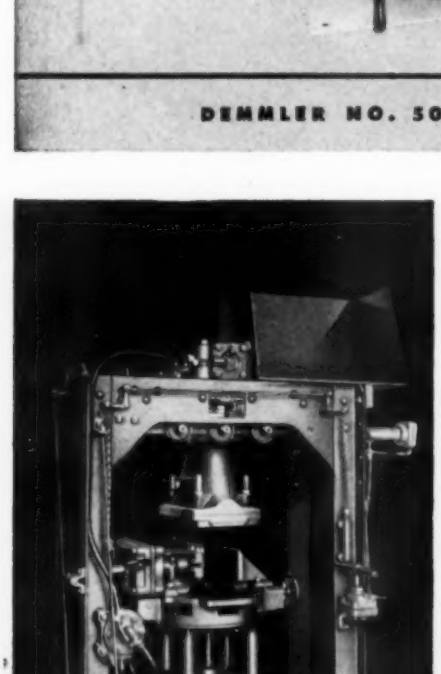
It is no news to the Foundry world that three prime requisites of profitable core making are rapid production, economical operation and the production of high quality cores. DEMMLER machines can be depended upon to meet all three of these requirements.

DEMMLER machines are ruggedly built throughout for hard foundry use. All have both horizontal and vertical adjustments. Jobs are easily and quickly changed.

Available in a wide variety of sizes to meet every requirement, DEMMLER core blowers possess scores of refinements born of long experience. First in the field, DEMMLER core blowers have led the field since 1911.

Before you buy a new core blower, be sure to investigate the many advantages DEMMLER machines offer. You'll be glad you did!

DEMMLER NO. 50



DEMMLER NO. 1

DEMMLER NO. 3E

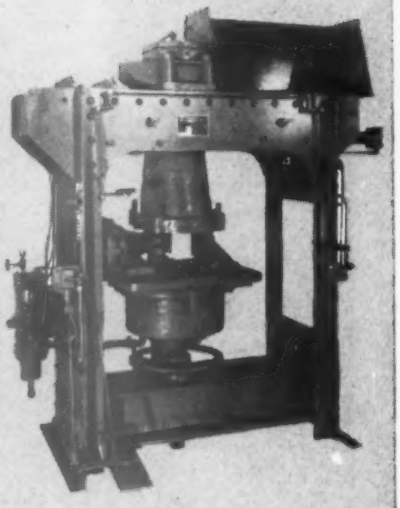
DEMMLER NO. 4E

MANUFACTURERS OF CORE BLOWERS EXCLUSIVELY SINCE 1911

because they are profitable to own

DEMMLER

CORE BLOWING MACHINES



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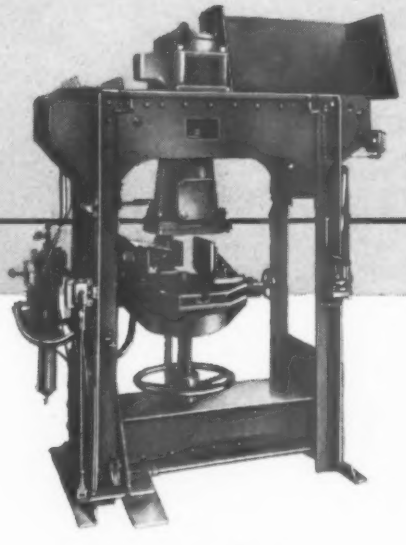

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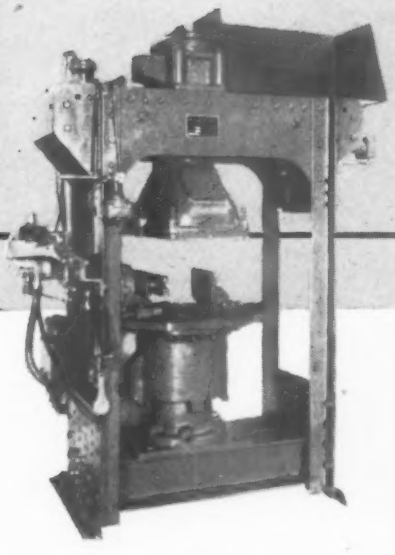
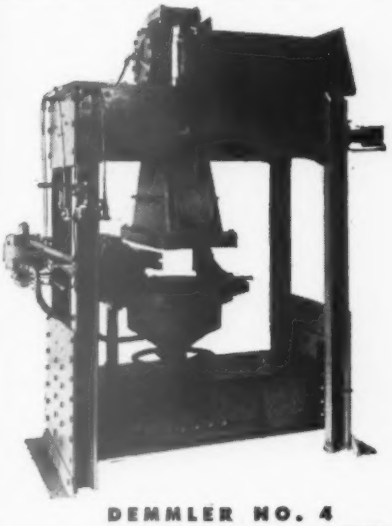


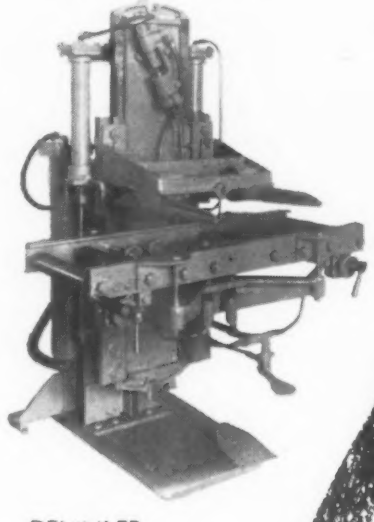
DEMMLER NO. 2E



DEMMLER NO. 4

CORE BOX VENTS

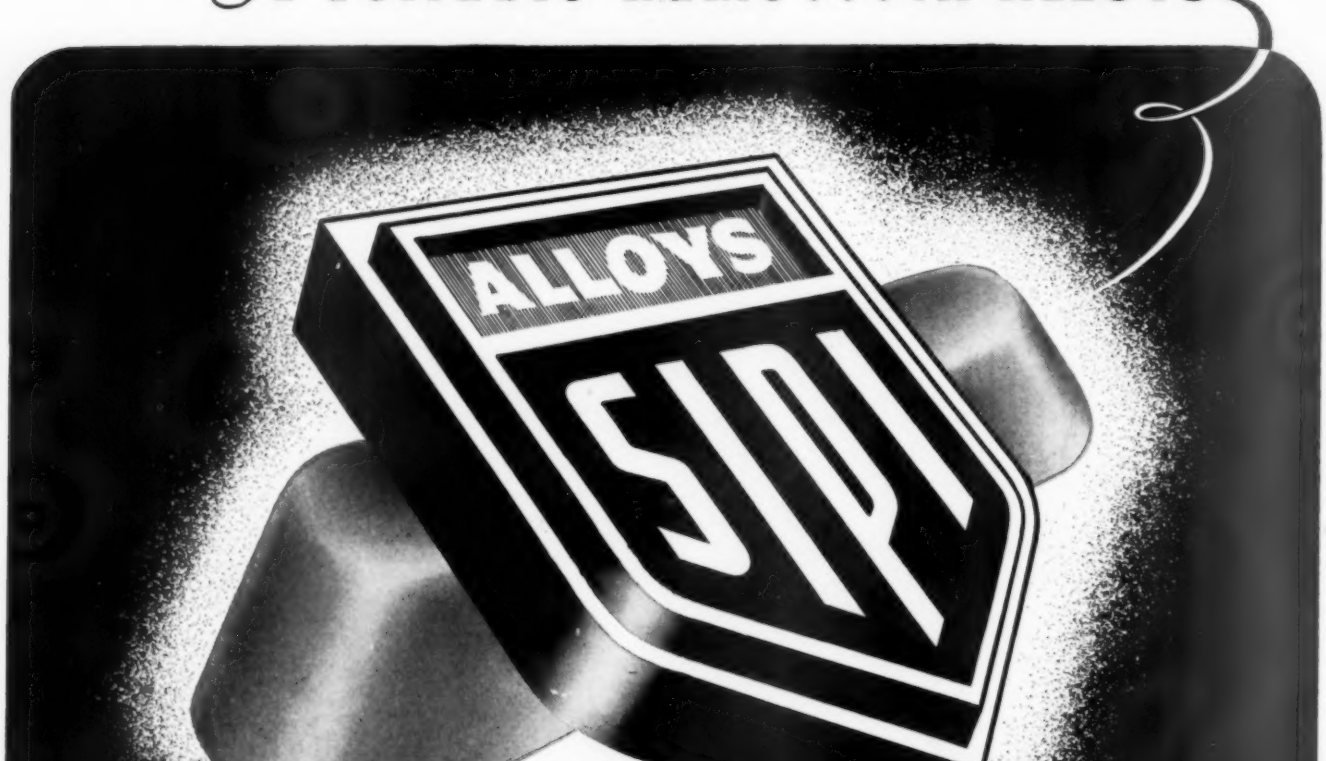
Wm. Demmler & Bros. also manufacture a complete line of precision made core box vents —rigidly constructed in varying sizes of slotted brass, slotted steel and screen mesh.



DEMMLER
CORE ROLL-OVER
DRAW MACHINE

Wm. **DEMMLER** *& Bros*
Kewanee, Illinois

A reliable name... **IN ALLOYS**



BRONZE INGOTS... from this institution are always uniform in quality—for excellent reasons. They are backed by years of experience and a tradition that permits no compromise with quality. SIPI is more than a trade mark. It is a symbol in alloys—as reliable a name as sterling on silver. The SIPI shield on an ingot is your guarantee that it meets the exacting specifications of industry and that it is the result of tireless research by skilled laboratory and plant technicians.

Silverstein and Pinsof

INCORPORATED

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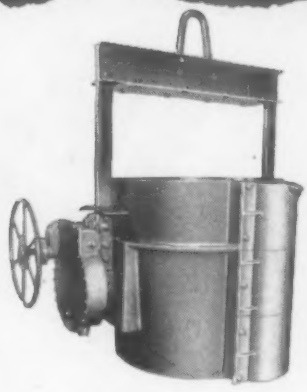
BRASS • BRONZE • ALUMINUM • LEAD • TIN • SOLDER • TYPE METALS • BABBITT • ZINC BASE ALLOYS

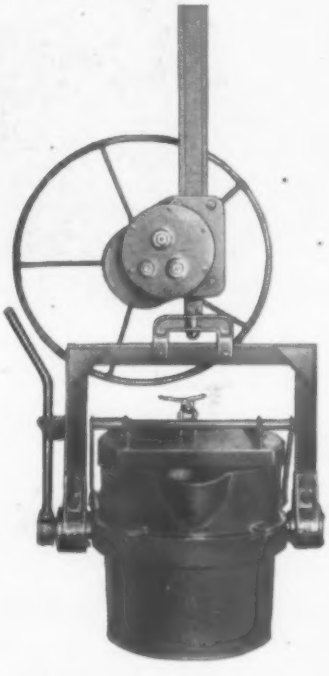
New Convenience and Economy in Handling Hot Metal

Cylindrical Pouring Ladle with side-shifting cover and antifriction bearing trunnions.



Outside Teapot Spout Ladle with self-aligning antifriction bearing trunnions.

Crane Ladles with air-cooled trunnions are available from 21½ to 79 inch top diameter.

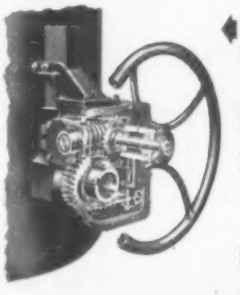


Pour-Rite Ladle Handlers for more accurate pouring. In 500, 1000, and 2000 lb capacities.

Engineered for Safety and Long Life

Heavy steel plate with welded reinforcing and welded pouring lips. Trunnions are air-cooled and protected by shot guards. Self-aligning antifriction bearings.

Pour-Rite LADLES



Pour-Rite Ladle Gearing has built-in alignment . . . backlash adjustment . . . automatic force feed lubrication.

New Catalog illustrates and describes over 200 Whiting Ladles. Write for a copy—ask for Bulletin FY-144.

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Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco, and Washington, D. C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, New York.

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The operating features of Ingersoll-Rand Air Tools make them extremely popular with the foundry men. You get—power regulation—durability—*more power per pound of weight*—trouble-free service and safety. In addition, each tool is backed by Ingersoll-Rand service in all industrial centers.

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Guide vane assembly of Jeffrey Aerodyne mine-ventilating unit. This consists of 15 cast iron vanes welded between inner and outer rings of heavy-gauge steel sheet with 5/32" Ni-Rod electrodes.

● ● ●

Close-up of guide vane assembly. Note smooth appearance of welds. One bead around each corner is all that is needed to bond a vane securely to the steel rings.

How welding cast iron to steel with NI-ROD SAVED 300 OPERATIONS PER ASSEMBLY

The Jeffrey Manufacturing Company, of Columbus, Ohio ... makers of Aerodyne Fan mine ventilating units ... were looking for a faster, simpler method of building their large guide vane sections.

The stumbling block was the fact that the 15 vanes are *iron castings*. The inner and outer rings between which they are mounted, are *steel sheet*. Although welding seemed like the obvious answer, cast iron-to-steel joints have usually been a crossed-fingers proposition.

After experimenting with several electrodes, Jeffrey engineers remained convinced that their standard fabrication method was the only way.

Here's what they had to do: Four slots had to be cast into each vane. In the thin sections between each pair of slots, they drilled two rivet holes. Then they had to cut out 60 pieces of strip steel, drill them, and rivet them into the slots.

Add that all up and it amounts to this: 60 holes drilled in the vanes, 60 pieces of steel cut to size, 120 more holes drilled in the steel strips, and 60 rivets to set. That makes 300 time- and labor-consuming jobs on each assembly, not to speak of a difficult casting job to put the slots in the vanes, and the final step, welding the steel strips to the rims.

And then came NI-ROD with the solution they were seeking.*

Ni-Rod quickly furnishes strong, sound deposits between the iron and steel. The smooth weld beads run all the way around each corner of each vane ... and are made without preheating.

* * *

On the basis of this experience, look over your own fabricating operations. Perhaps Ni-Rod can save you time and money in your production lines. You'll also find Ni-Rod great for general maintenance and repair work.

Ni-Rod comes in 3/32", 1/8", 5/32" and 3/16" diameters. Order a 5-lb. package from your nearest NI-ROD distributor. And, be sure to ask for a copy of the Ni-Rod Instruction Booklet.

*Reg. U. S. Pat. Off.

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Resulting from—

Mulling the sand every cycle in a *Simpson!*

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CALIFORNIA

March 25, 1947

National Engineering Company
549 West Washington Boulevard
Chicago 6, Illinois

Attention: Mr. Otto H. Rosentreter
West Coast Manager
Los Angeles, California

Dear Mr. Rosentreter:

When you called at our plant recently, you inquired regarding the performance of the sand conditioning system which National Engineering Company furnished for our foundry. For your information this equipment has been in daily operation since it was installed in 1940, and its efficient operation has enabled us to achieve production per man far beyond our expectations.

The Simpson Intensive Mixer and auxiliary equipment is giving us the closely controlled and uniform quality molding sand so essential for quality castings at high speed. In addition, it results in substantial savings in new sand and bond.

Maintenance costs have been extremely low on the National Unit. In fact, were I to build a new foundry I would duplicate the present system with no major changes. National has done a highly creditable job in designing and furnishing this equipment for our foundry.

Very truly yours,

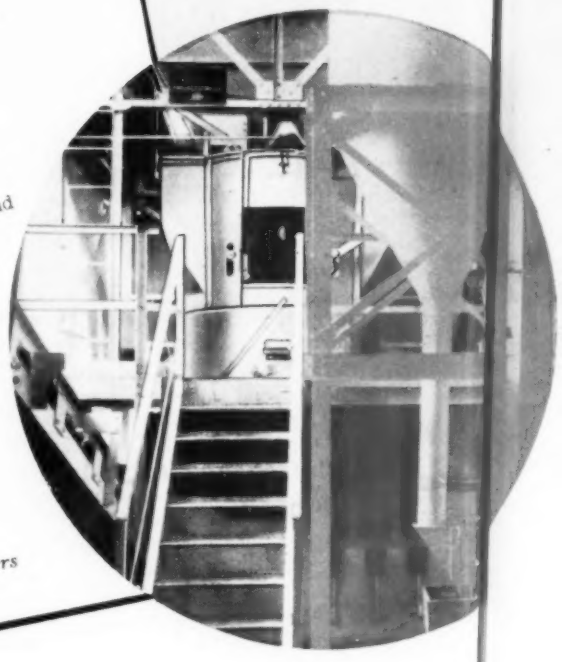
Geo. W. Fuller

Geo. W. Fuller
Plant Manager
REPCAL BRASS MFG. CO.

GWF:yw

Manufacturers of the World's Most Complete line of fine Showers

Shown below is a partial view of the Simpson Intensive Mixer installed at the Repcal Brass Mfg. Co., foundry, Los Angeles, Calif.



FOUNDRY EQUIPMENT

NATIONAL ENGINEERING COMPANY

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Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

Interior view of a Simpson Mixer, showing the heavy mullers responsible for the efficient controlled mixing of foundry sands.

another example of the advantages offered to smaller foundries by SIMPSON *Intensive* MIXERS

• More and more non-ferrous foundries, including numerous smaller operators, are taking advantage of the lower production costs . . . lower operating costs . . . lower maintenance costs . . . less installation space required . . . faster production . . . and the constantly higher product quality available by the controlled mixing of sands in a Simpson Mixer.

A typical example of a small, yet complete sand preparing plant, designed around a Simpson Mixer, is demonstrated at the Repcal Brass Mfg. Co. foundry. This unit combines extreme compactness with ample capacity, flexibility, and simplicity of operation.

For proof of the advantages made possible by mulling the sand ***every cycle*** in a Simpson Intensive Mixer, we refer you to the letter reproduced on the opposite page . . . one of numerous such letters in our files attesting to the dependability of Simpson Mixers and National Engineering ***service.***

Let a National Engineer show you how to step up production, lower costs, and improve the quality of iron . . . steel . . . or non-ferrous castings. Write for details.

The large view above, shows six of the twelve molding stations at the Repcal foundry. Note the new type of mold clamp used in place of conventional weights. These ingenious clamps, designed by Mr. George Fuller, are now manufactured by National Engineering Company, and are available for industry-wide use.

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USED IN GOOD FOUNDRY PRACTICE FOR 38 YEARS

An Organic

CORE BINDER

FOR FOUNDRY CORES FACINGS AND SPRAYS

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Time tested for 38 years, BINDARENE continues to maintain a definite place in foundry practice today.

Working alone or as a partial substitute for oil, BINDARENE effects worthwhile savings in binder costs. Cores run freely and completely from castings, and require less venting. BINDARENE is equally well adapted to light or heavy work.

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Pangborn PIONEERS AGAIN!

NEW wet blast development cleans castings and knocks out cores at same time...rapidly...economically!

Now — core removal and sand blasting of large, medium and small castings can be accomplished in one economical operation — in a single flood-lighted enclosure!

Pangborn's new HYDRO-SAND BLAST AND CORE KNOCKOUT — shown above in successful operation at a Cincinnati foundry — uses a combination of sand and water to remove cores and clean castings, inside and out.

A turret gun — operated *from outside* the heavy steel plate room — directs a sharp stream of sand and water, at 1200–1600 psi upon the casting mounted on a rotating table. (75 gallons of water per minute with entrained sand).

Sand is re-usable. After tramp material has been screened out, the sand is returned to the sand blast tank.

Core-Knockout Features

Proven features of the HYDRO CORE-KNOCK-OUT BLAST ROOM have been retained —

- Quick cleaning of fillet and pockets
- Core rods removed without sledges
- No bending or distortion of core rods
- Roll-back roof for crane-loading of large pieces
- Two water-cleaned glass windows
- Free-turning table can be stopped in any position

For further information on HYDRO-SAND BLAST AND CORE KNOCKOUT, write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment.* Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Md.

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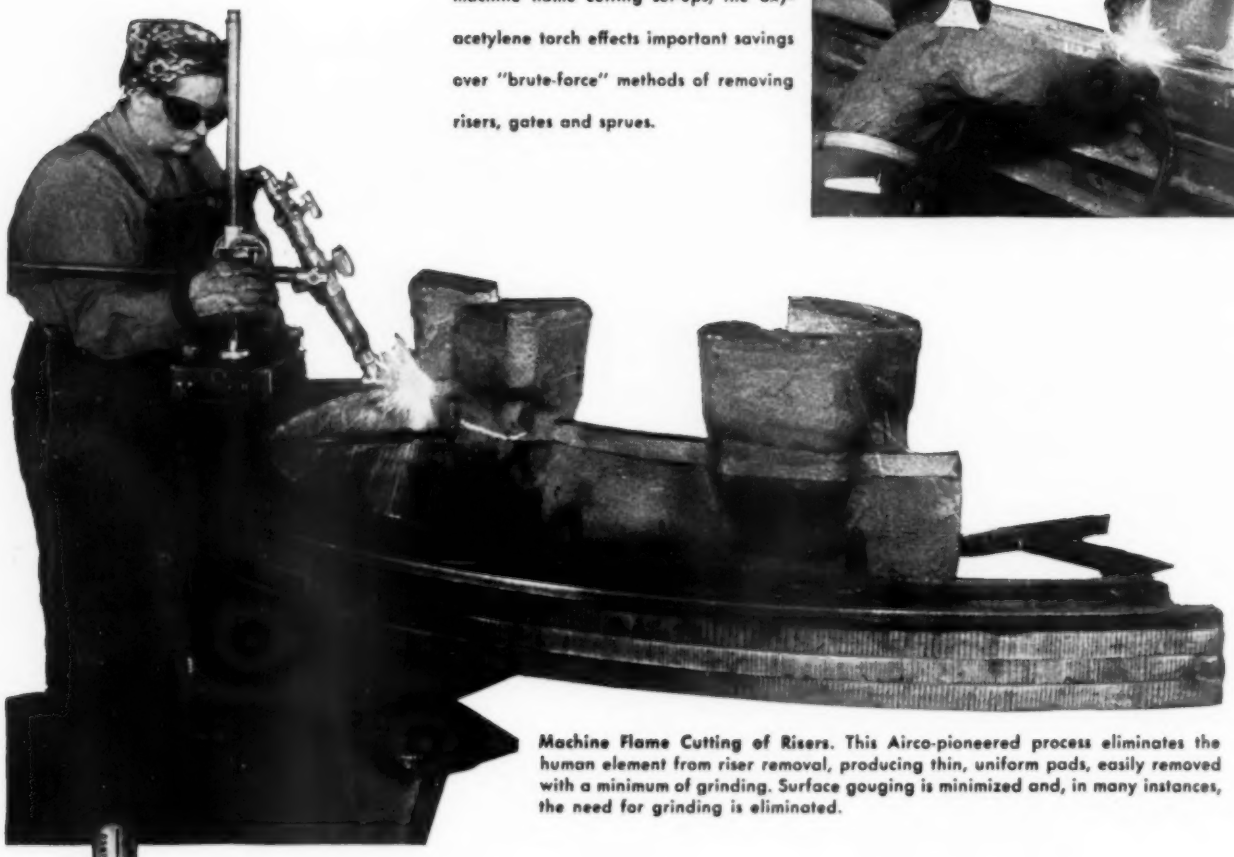
with the right equipment for every job

Airco Processes Help to Set

Hand Flame Cutting of Risers. Where quantities involved do not justify machine flame cutting set-ups, the oxy-acetylene torch effects important savings over "brute-force" methods of removing risers, gates and sprues.



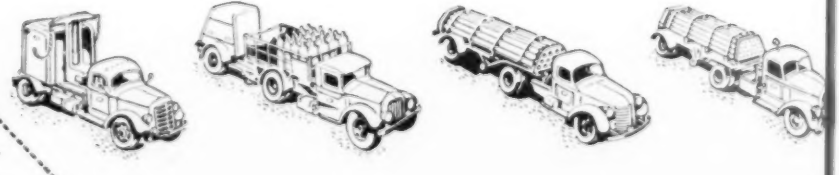
Machine Flame Cutting of Risers. This Airco-pioneered process eliminates the human element from riser removal, producing thin, uniform pads, easily removed with a minimum of grinding. Surface gouging is minimized and, in many instances, the need for grinding is eliminated.

Thoroughly familiar with foundry operations through long years of service to the industry, Airco engineers have worked unceasingly to develop better methods of performing operations recognized as bottlenecks in steel casting production. From this work have come new and improved practices which helped foundries set new production records and which point the way to more profitable operations.

These processes, illustrated here, and others such as flame hardening, maintenance welding and hardfacing of equipment subject to wear, are described in detail in the booklet "New and Improved Oxy-acetylene Methods for Steel Foundries". Copies may be obtained by filling in and mailing the coupon on the left. Send for your free copy today.

Airco's Technical Sales Division will be glad to assist you in applying these modern methods to your own foundry operations. 'Phone or write the Airco field office nearest to you.

AIRCO OXYGEN—"PACKAGED" TO SUIT YOUR NEEDS



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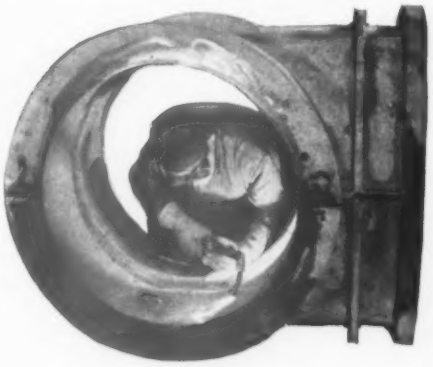
New Casting Production Records

Flame Gouging. Another new Airco oxy-acetylene process, removes webs and fins and gouges out defects in a fraction of the time required for chipping.



Flame Scarfing Riser Pads. This new Airco-developed process burns off riser pads fifty times as fast as they can be removed by grinding — half again as fast as they can be "washed away" with the carbon arc. It produces a superior surface and can be controlled within 1/16" depth.

Oxygen Lancing. A faster, more economical method of tapping furnaces, cupolas and ladle nozzles, and cutting up ladle skulls, spills and heavy scrap for remelting.

Flame Descaling. This new Airco process descales normalized or annealed castings in one-fourth the time required with the chipping chisel — and produces a cleaner surface.

A.C. Arc Welding. This modern method quickly and smoothly fills in cavities left in castings after defects have been gouged out.

AIRCO PROCESSES FOR NON-FERROUS CASTINGS

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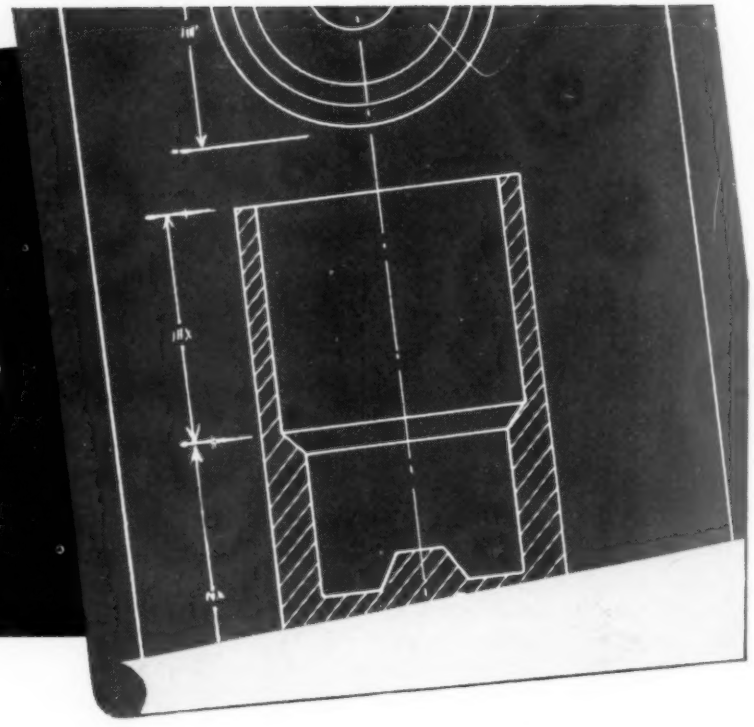
molds made of GRAPHITE... retain dimensions in repeated use



Molds made of International Graphite can be used over and over again—far longer than other types of molds in common use. Users have proved this fact repeatedly—in actual casting operations. International Graphite molds combine the *right* chemical, mechanical, and thermal characteristics to retain their shape and strength at white hot temperatures. That's why International Graphite has proved extraordinarily successful in the casting of carbides and high melting alloys, sintering under pressure, centrifugal casting, in *many* difficult applications.

Available Sizes:	Graphite Mold Grades
3 x72"	16 x60"
4 x72"	18 x60"
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6 x72"	4x 4 x30"
7 x72"	8x 8 x48"
8 x72"	16.3x16.3x48"
9 x72"	2x10 x72"
10 x72"	3x 6 x72"
12 x72"	3x 9 x52"
14 x72"	4x10 x72"

Other advantages of Graphite Molds: no spalling or cracking; easy machineability; not wet by molten metals . . . no sticking; low thermal expansion . . . no deformation at high temperatures; no inclusions in ingots or castings; light weight and low cost.

Discover for yourself *all* the advantages of Graphite Molds in *your* casting operations. Demand *International* Graphite Mold material for the best results in economy and all-round satisfaction. Write for details and prices today.

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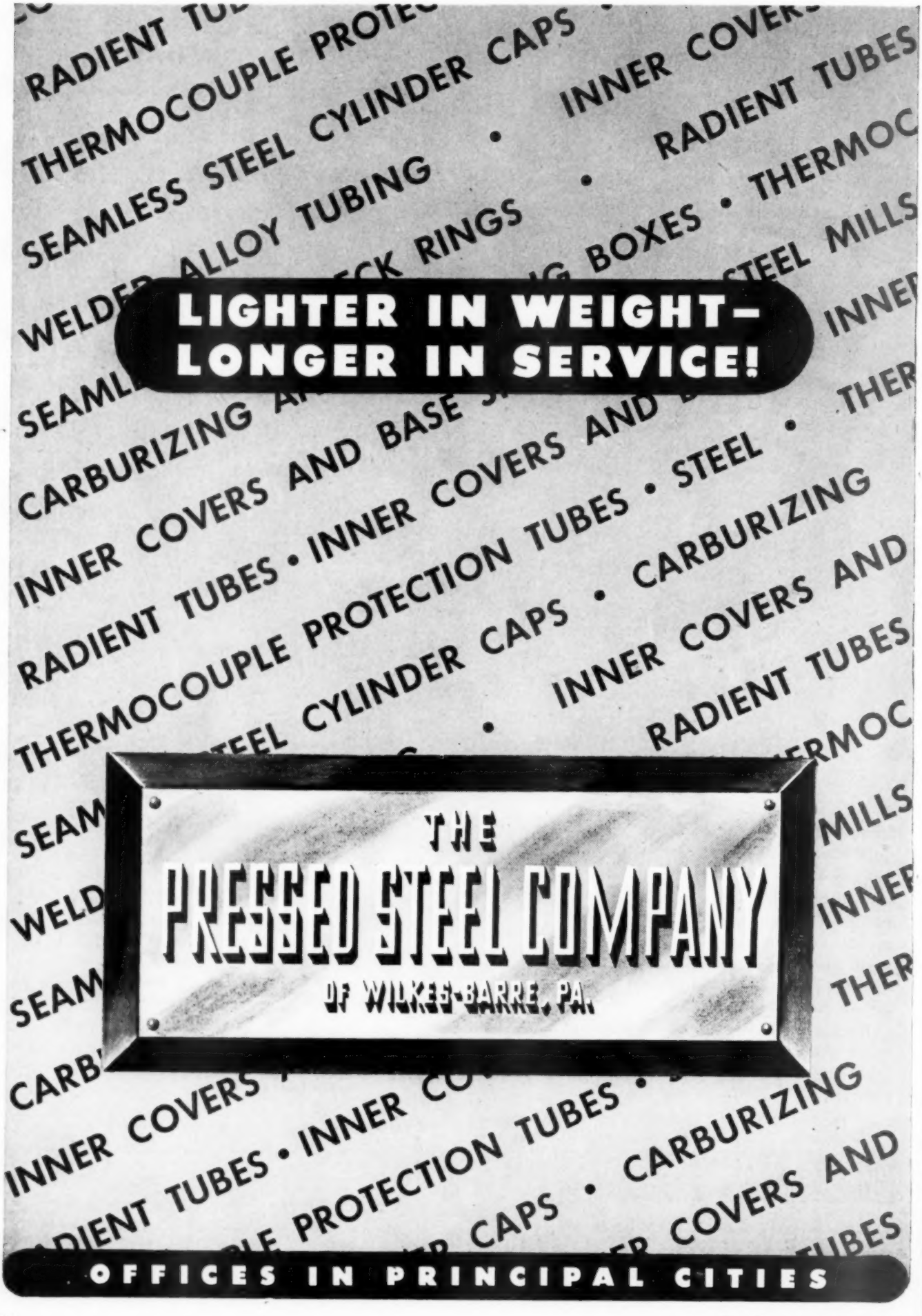
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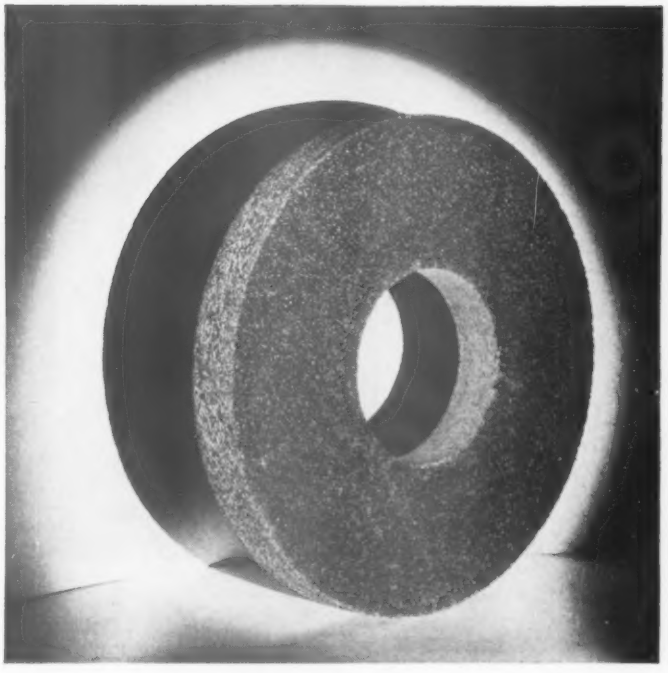

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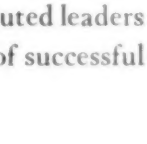

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Round bushing and pin
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Exploded round pin and bushing
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You can easily get the perfect line-up of cope and drag that will speed quantity production of true castings in your foundry. Just equip your flasks with Universal Flask Pins and Bushings, made in various standard sizes and shapes or in special types to your specifications. Taper type anchor firmly with self-locking nuts. Universal standard flask pins and bushings utilize round and elongated bushings and round pins, thus forming an assembly that insures perfect alignment and at the same time permits longitudinal expansion resulting from metal heat. They will bring greater speed to your casting production line, for the cope bushings are easily and quickly guided to the drag pins over a tapered, loose-fitting closing pin which is removed after the assembling is completed. Universal Flask Pins and Bushings are precision machined, hardened, and ground for lasting accuracy and maximum resistance to wear. Write for new catalog giving complete particulars.

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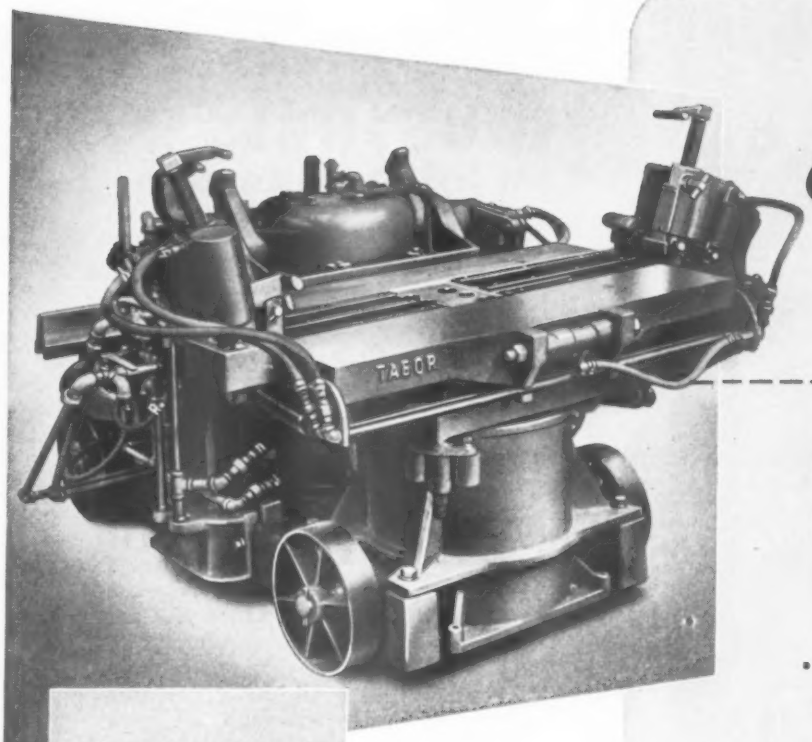

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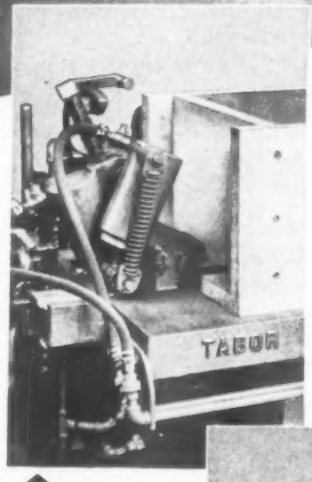
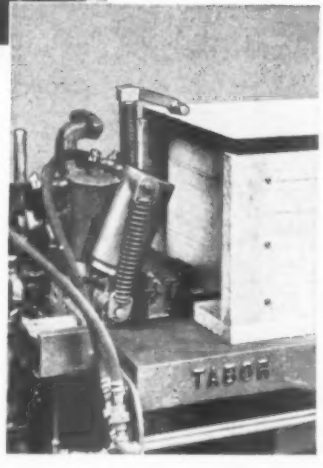


Core box clamped

Core box and core plate clamped



*Can easily be installed in your present Tabor roll-over machine if its capacity is within the range of 600 to 3000 pounds.

IT'S a Tabor innovation! The new plate design permits *independent* setting of all four clamps. Always big producers, these machines now lend themselves to exceptionally rapid change-over—become invaluable in either core room or jobbing shop where pattern changes are frequent.

Designed to produce the larger cores—the jobbing shop molds, these machines are furnished either plain jar or shockless. The latter is recommended for upper-floor installation—for freedom from vibration and consequent damage to completed cores.

TABLE OF STANDARD SIZES

Size of Machine	Width of Core Box or Flask		Length of Core Box or Flask		Height—including core plate	
	Min.	Max.	Min.	Max.	Min.	Max.
22"	10"	22"	20"	40"	7½"	14"
30"	15"	30"	26"	46"	8"	18"
40"	20"	40"	28"	56"	12"	25"

REPRESENTATIVES

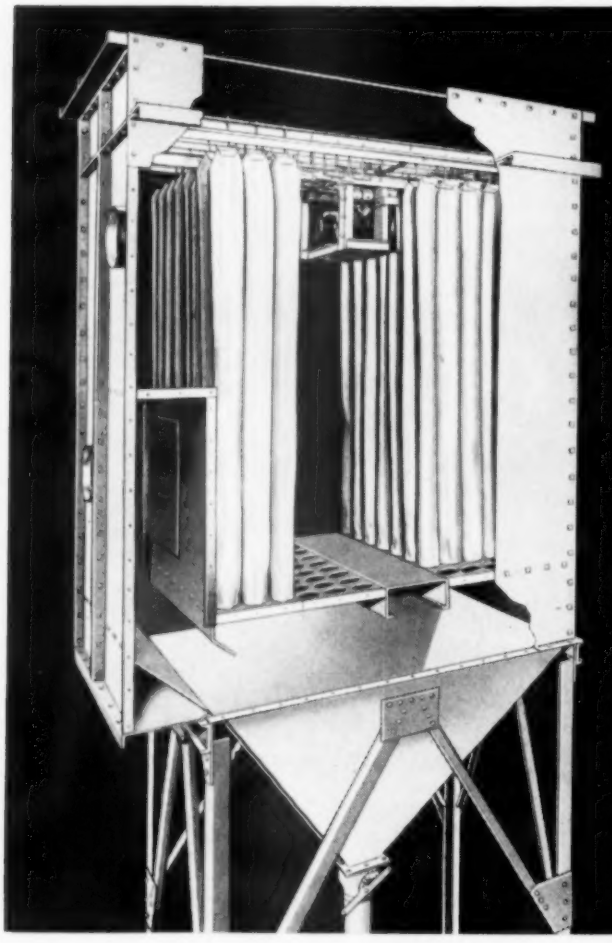
Snyder Foundry Supply Company, Los Angeles, California; Gallagher Foundry Supply Company, San Francisco & Oakland, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis1, Mo.; E.R. Frost Co., Inc., Minneapolis 14, Minn.

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

The TABOR Manufacturing Co.

SINCE **1884** MANUFACTURERS OF FOUNDRY MOLDING MACHINES

6225 TACONY STREET • PHILADELPHIA 35, PENNA.



High Efficiency DUSTUBES
Cost less to operate and Maintain

The filter cloth in a Dustube lasts longer because it is never under tension . . . never in contact with metals that abrade and corrode. With the Dustube you can be absolutely certain the cloth is in perfect condition because inspection can be made so quickly and easily . . . there is nothing to disassemble. Appreciable savings in power result by reason of the fact that resistance to air flow is reduced by providing large expansion areas, by ample spacing of tubes, and by the effectiveness of the shaker method of cleaning the cloth. Other important savings accrue by reason of the ease and speed with which tubes can be installed and replaced . . . it takes less than a minute per tube and only one man is required.

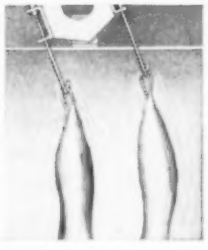
only *DUSTUBE* gives you all these design advantages

HIGH EFFICIENCY

Actual performance results prove that DUSTUBES meet the most exacting requirements. Extremely fine dusts particularly those within the low micron size range, such as silica are trapped with nearly 100% efficiency.

LOW COST MAINTENANCE

A DUSTUBE filter can be installed in a few seconds by ONE MAN, using no tools. He merely hangs the tube on a hook attached to the shaker channel overhead, and inserts the spring band in the cell plate below.



MONEY SAVING ECONOMY

There are few working parts to wear. Power savings are effected by less over-all resistance to air flow, and a fast acting, highly efficient shaker method of thoroughly cleaning the cloth.

EXTENDED CLOTH LIFE

Wear on the cloth of a DUSTUBE is negligible because the tubes are never under tension . . . there are no metal contacts to corrode or abrade . . . coarse, heavy dusts are carried into the hopper before they reach the cloth.

EASY INSPECTION

Filter tubes in a DUSTUBE can be readily inspected without removing them. The operator can view every tube from a central walkway in the Knocked-Down type collector, or from the doorway of an assembled type collector.

Write today for more complete information about the many advantages of DUSTUBE dust collectors. Ask for Catalog 72.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
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dustube
DUST COLLECTORS

A Great Industry Is Beginning to Move

WHEN Arthur H. Motley told his audience at the annual banquet of the American Foundrymen's Association that "tradition is being thrown out the window," he described in a few words the transition that now is well under way in the foundry industry. No longer is the production of castings a mysterious process which is handed down reluctantly from generation to generation. Instead, the knowledge and experience of thousands of individuals and of hundreds of companies are being pooled for the benefit and progress of the entire foundry industry. Rule of thumb methods rapidly are disappearing. In their place the men of the industry are developing procedures and practices which are based upon the latest scientific and engineering knowledge. These will permit constant control of the variables in foundry operations, and the production of a high grade product capable of meeting completely the demands for castings of this complex civilization. These scientific developments in materials and machines also will provide better plants in which to cast metals.

The record-breaking attendance and the tremendous interest displayed at the 1947 annual convention of the AFA in Detroit gave ample proof, if such proof is needed, of the extent to which this transformation is progressing. More foundrymen—foundry executives from presidents all the way down the line—gathered at this non-exhibit convention, than have attended any similar event in the history of the association. They were in Detroit for the sole purpose of exchanging valuable information in order to improve production practices. From the opening meetings in the beautiful Horace H. Rackham Educational Memorial, to the closing banquet four days later, speaker after speaker stressed the opportunities of the industry, the progress that has been made, and the probable trends for future developments. So many foundrymen wanted to participate in these sessions—some highly technical and others built on more practical lines—that an adequate supply of meeting rooms sufficiently large to accommodate the crowds could not be found. A better idea of the constantly growing thirst for greater foundry knowledge may be obtained by adding to the record-breaking registration at Detroit, the thousands who attend the regional conferences held annually in various parts of the country, the regular chapter and local group meetings, and the technical meetings of the several foundry trade associations.

But the new era is just beginning, and the future offers untold opportunities. George T. Christopher of Packard, expressed this well at the opening general meeting when he said: "I don't know of any other industry having brighter prospects and greater opportunities for advancement. Full of unpredictables, the foundry industry is still a field without horizons—wide open for ingenuity and enterprise."

As never before in its history, the foundry industry is looking to the future. In the words of Shelly Wood, "We have a great industry and we are beginning to move."

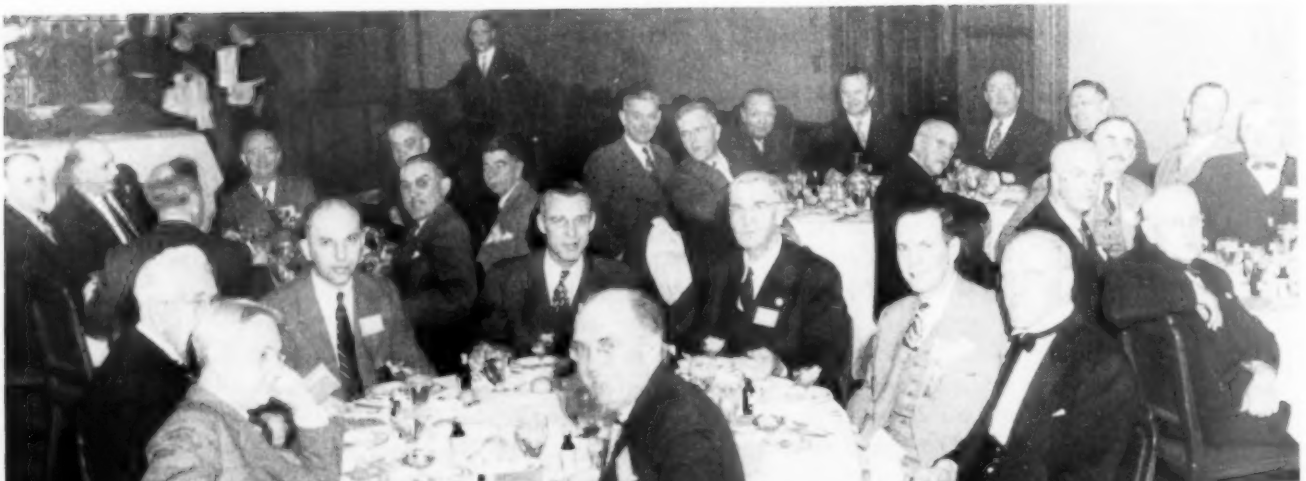
Frank G. Steinebach
Editor

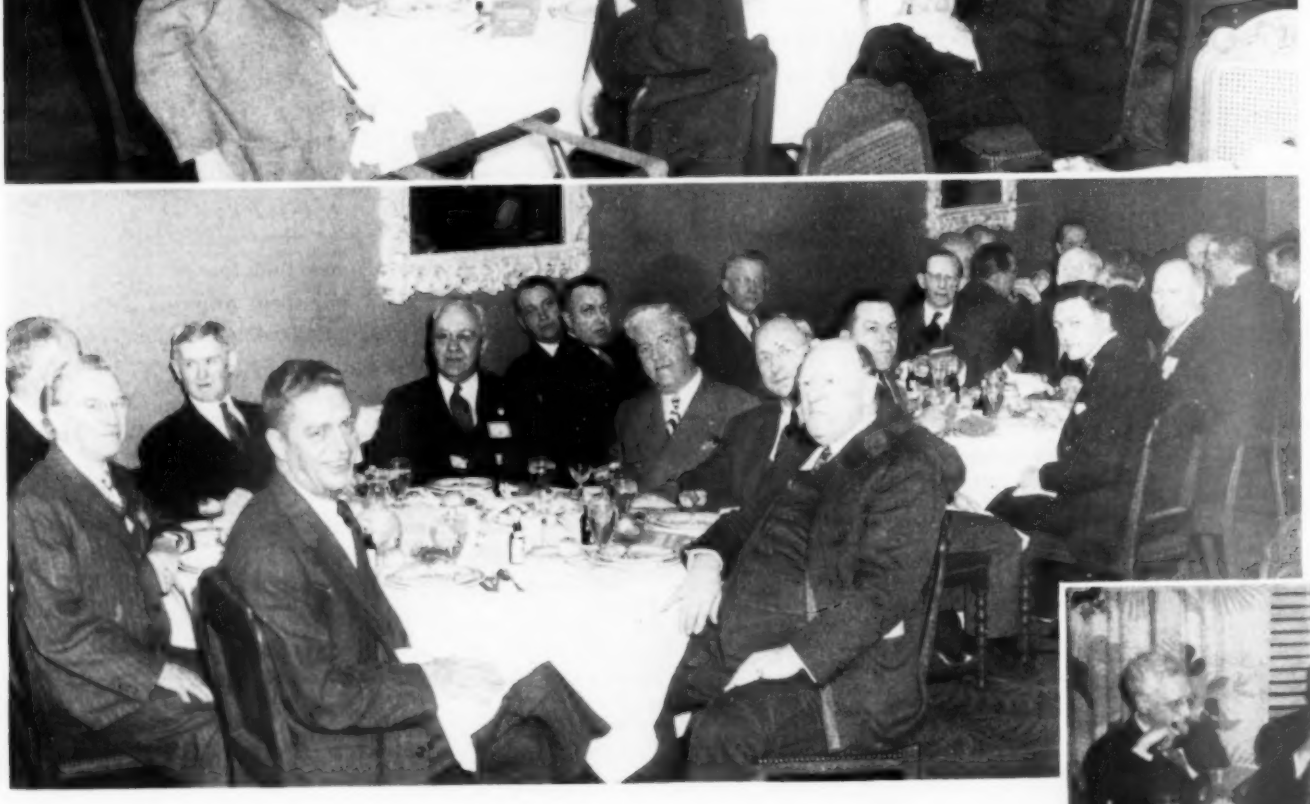
MAX KUNIANSKY
President-elect

WILLIAM B. WALLIS
Vice President-elect

a Fa

HASR E





Annual Meeting

RECORD ATTENDANCE

ATTESTING to the broadened interest of foundrymen in developments of their industry, a record number of 3500 persons participated in the 51st annual meeting of the American Foundrymen's Association in Detroit, April 28 to May 1. With the largest attendance in the association's history for a convention without the biennial exhibit of foundry equipment and supplies, the more than 80 technical papers, lectures, round-table and shop course discussions were presented to large and, in some cases, overflow audiences.

A plea for increased production of castings in order to avoid a potential bottleneck in material supplies for the automotive industry was made at the opening general meeting, Monday afternoon, by George T. Christopher, president and general manager, Packard Motor Car Co., Detroit. This general meeting, held at the Rackham Educational Memorial, was opened by Arthur H. Allen, Detroit editor, THE FOUNDRY, and chairman of both the Detroit Chapter and the convention's general committee. He extended the welcome of the chapter and introduced Mayor Edward J. Jeffries Jr. of Detroit who offered visitors the city's hospitality. Sheldon V. Wood, national president of the AFA, spoke briefly and urged the foundry industry to pay more attention to its personnel problems. He declared that such matters receive far less consideration than they should in proportion to the share which they represent of total foundry costs.

In his address, Mr. Christopher pointed out that if present production of castings represents ultimate capacity, the foundry industry cannot furnish sufficient castings to meet the automotive industry's requirements for a five to six million car year. He stated the foundry industry must make itself attractive to capable workers and to promising youngsters graduating from schools into industrial life. He added that the foundry industry in 1946 had a market potential exceeding $7 billion and that he knew of no industry with brighter prospects and greater opportunity for advancement. The full text of Mr. Christopher's remarks starts on page 85 of this issue.

The president's annual address was presented Wednesday afternoon by Mr. Wood before an unusually large audience which attended the annual business meeting and the Charles Edgar Hoyt Annual Lecture. Mr. Wood first read a message of greetings from D. Howard Wood, president, and Tom Makemson, secretary, the Institute of British Foundrymen. Reporting on association growth during the last year Mr. Wood stated that membership had increased to 9364 as of April 1, compared with 8073 a year ago. The association now has 38 chapters, an increase of five the last 12 months, and nearly 90 per cent of the association's members are associated with one of these chapters. Mr. Wood praised the work of the approximately 110 committees of the association and pointed out that numerous opportunities for committee work also are present in the various chapter organizations. Reference was made to the participation by the AFA in the recent organization of the National Castings Council, which is intended to represent the casting industry as a whole.

Winners in the national apprentice contest were announced by William W. Maloney, AFA secretary-treasurer. Mr. Maloney reported increased interest in participation in this contest. Winners in the various divisions were: *Patternmaking*—First prize, William Waddicor Jr., Browne & Sharpe Mfg. Co., Providence, R. I., second prize,

Left and below—Members of the AFA Alumni Group, including past presidents, directors, medalists and honorary life members, at their annual dinner

Howard J. Rand, Aluminum Co. of America, Cleveland; third prize, Laurent Messier, Acme Pattern & Woodwork Co. Ltd., Montreal, Que.

Steel Molding—First prize, Harold Gobeille, Crucible Steel Casting Co., Cleveland; second prize, John Colombo, Crucible Steel Casting Co., Cleveland; third prize, Walter J. Bach, Indiana Harbor Works, American Steel Foundries, E. Chicago, Ind.

Gray Iron Molding—First prize, Floyd G. Matthews, Caterpillar Tractor Co., Peoria, Ill.; second prize, Robert Miller, Hill Acme Co., Cleveland; third prize, Leo Prushinski, Sheffield Foundry Co., Chicago.

Nonferrous Molding—First prize, John Hronek, Wisconsin Aluminum Foundry Co. Inc., Manitowoc, Wis.; second prize, David Gregory, Empire Brass Foundry Ltd., Montreal, Que.; third prize, Wilson Bruce, Buckeye Brass Co., Cleveland.

First prize winners in the different divisions were present at the meeting to receive their awards from Mr. Wood.

Secretary Maloney announced the names of nominees selected by the nominating committee for officers and directors of the association for 1947-48, and in the absence of additional nominations, cast a unanimous ballot for the following: President, Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchbug, Va.; vice president, William B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh; directors for three years, E. N. Delahunt, general superintendent, Warden King Ltd., Montreal, Que.; William J. MacNeill, G. H. R. Foundry Division, Dayton Malleable Iron Co., Dayton, O.; Russell H. McCarroll, director of chemical and metallurgical engineering and research, Ford Motor Co., Dearborn, Mich.; John M. Robb Jr., resident manager, Hickman, Williams & Co., Philadelphia, and A. C. Ziebell, president and treasurer, Universal Foundry Co., Oshkosh, Wis. On his retirement as president, Sheldon V. Wood will serve a one-year term as a director, succeeding Fred J. Walls, the association's immediate past president.

Activities of the recently organized Educational Division of the AFA were discussed briefly by Fred G. Sefing, International Nickel Co., New York, chairman of the division. Ben D. Claffey, General Malleable Corp., Waukesha, Wis., a trustee of the new Foundry Educational Foundation, discussed the campaign being launched by this group in its aim to help provide educational facilities at engineering schools which will fit qualified young men to fill places of responsibility in the foundry industry.

The first Charles Edgar Hoyt Annual Lecture, entitled "The Cupola Furnace," was presented by Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham. This lecture comprised a comprehensive review of the development of the cupola furnace since its inception many years ago. Dr. MacKenzie showed numerous slides illustrating early types of cupolas and discussed many variations which have been attempted in design of the stack, tuyeres and auxiliary equipment, including the balanced blast cupola, hot blast cupola and dehumidifying equipment.

The speaker did not attempt to discuss extensively the correct procedure for operation of the present day type of furnace. However, he referred briefly to various important considerations, including the need for a good refractory lining, selection of the proper size of scrap and pig iron in relation to the size of the stack, and the use of the correct height of coke bed. In the last named respect he mentioned that cupola operators many years ago also emphasized the importance of the coke bed height.

At the conclusion of the lecture Dr. MacKenzie was presented with a desk clock by Harry M. St. John, Crane Co., Chicago, chairman of the annual lecture committee.

Below—S. V. Wood, AFA president, addressing opening general meeting of the convention. Also shown, left to right, are Mayor Edward J. Jeffries Jr. of Detroit; J. L. Mahon, American Car & Foundry Co.; Max Kuniansky, AFA president-elect, and Fred J. Walls, immediate past AFA president

Top Right—New AFA directors elected for three-year terms. S. V. Wood, as retiring president, will become a director for one year

Center right—Aluminum and Magnesium Division round-table luncheon

Bottom right—Partial view of the Brass and Bronze Division luncheon

WILLIAM J. MacNEILL E. N. DELAHUNT RUSSELL H. McCARROLL JOHN M. ROBB JR. A. C. ZIEBELL

One of the highlights of the annual banquet held in the grand ballroom of the Book-Cadillac Hotel Thursday evening at the conclusion of the convention was the presentation of AFA gold medal awards and honorary life memberships to six outstanding members of the association. Sheldon V. Wood, national president, presided at the banquet, and Fred J. Walls, International Nickel Co., Detroit, chairman of the Board of Awards, presided at the awards portion of the evening. Harry M. St. John, Crane Co., Chicago, was presented the William H. McFadden Gold Medal by Dr. G. H. Clamer, Ajax Metal Co., Philadelphia. Russell J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J., received the John A. Penton Gold Medal from Max Kuniansky. Richard A. Flinn Jr., American Brake Shoe Co., Mahwah, N. J., received the Peter L. Simpson Gold Medal from Don J. Reese, International Nickel Co., New York. The Joseph F. Seaman Gold Medal awarded to Henry S. Washburn, Plainville Casting Co., Plainville, Conn., was accepted for him by his son, R. R. Washburn, from H. F. Simpson, National Engineering Co., Chicago.

Honorary life memberships in AFA were presented to John Grennan, former foundry practice instructor, University of Michigan, and to Sheldon V. Wood, as retiring national president of the AFA.

Principal speaker at the banquet was Arthur H. Motley, president, Parade Publications Inc., New York. Mr. Motley, a versatile speaker, won his audience in combining witticisms with a serious discussion of the need for increased faith in the future of our American way of life.

Max Kuniansky, national president-elect, presided at the chapter officers' and directors' dinner held Tuesday evening. This informal meeting was well attended, with representatives present from practically all the various chapters. Mr. Kuniansky spoke briefly and made a plea for improving as much as possible the quality of the programs presented at the various chapter meetings.

Graduates of more than 25 different engineering schools were represented at the Engineering School Graduates' luncheon held Wednesday noon. Fred J. Walls, International Nickel Co., Detroit, presided, with George K. Dreher, Olds Alloys Co., Southgate, Calif., as co-chairman. Work of the Educational Division was discussed briefly by Fred G. Sefing, division chairman, and John M. Price, Ferro Machine & Foundry Co., Cleveland, and chairman of the fund raising committee of the Foundry Educational Foundation, explained the aims of this group.

At the annual dinner meeting Wednesday night of the AFA Alumni Group, including in its membership past presidents, national directors, medalists and honorary life members, John H. Van Deventer, director of information, Committee for Economic Development, New York, claimed that in America we have arrived at the doorstep of an era of unparalleled prosperity. We have built a great technological machine of production capable of supplying all of our needs and most of our wants. We have a labor force of sufficient size and skill to keep it going full speed. We have engineering and managerial talent capable of progressively turning out more and better goods and services for more and more people. The price of admission is the promotion of objective study, informed thinking and constructive action.

Following an eloquent development of a theme which included a description of the aims and objects of the Committee for Economic Development, the speaker concluded with the CED Statement of Principles:

"We in CED believe in a free competetive capitalistic economy. We are opposed to any measures which are a threat to its continued existence or development. We recognize that there is need for voluntary joint action, but when such action is undertaken either by government or private groups, the one most important test of that action should be whether it contributes to the stature of our people as members of a free (*Please turn to page* 128)

Right—Participants in the opening general meeting included, left to right, A. H. Allen, Detroit Chapter chairman; G. T. Christopher, president, Packard Motor Car Co.; S. V. Wood, AFA president; F. J. Walls, immediate past president; J. H. Smith, national director

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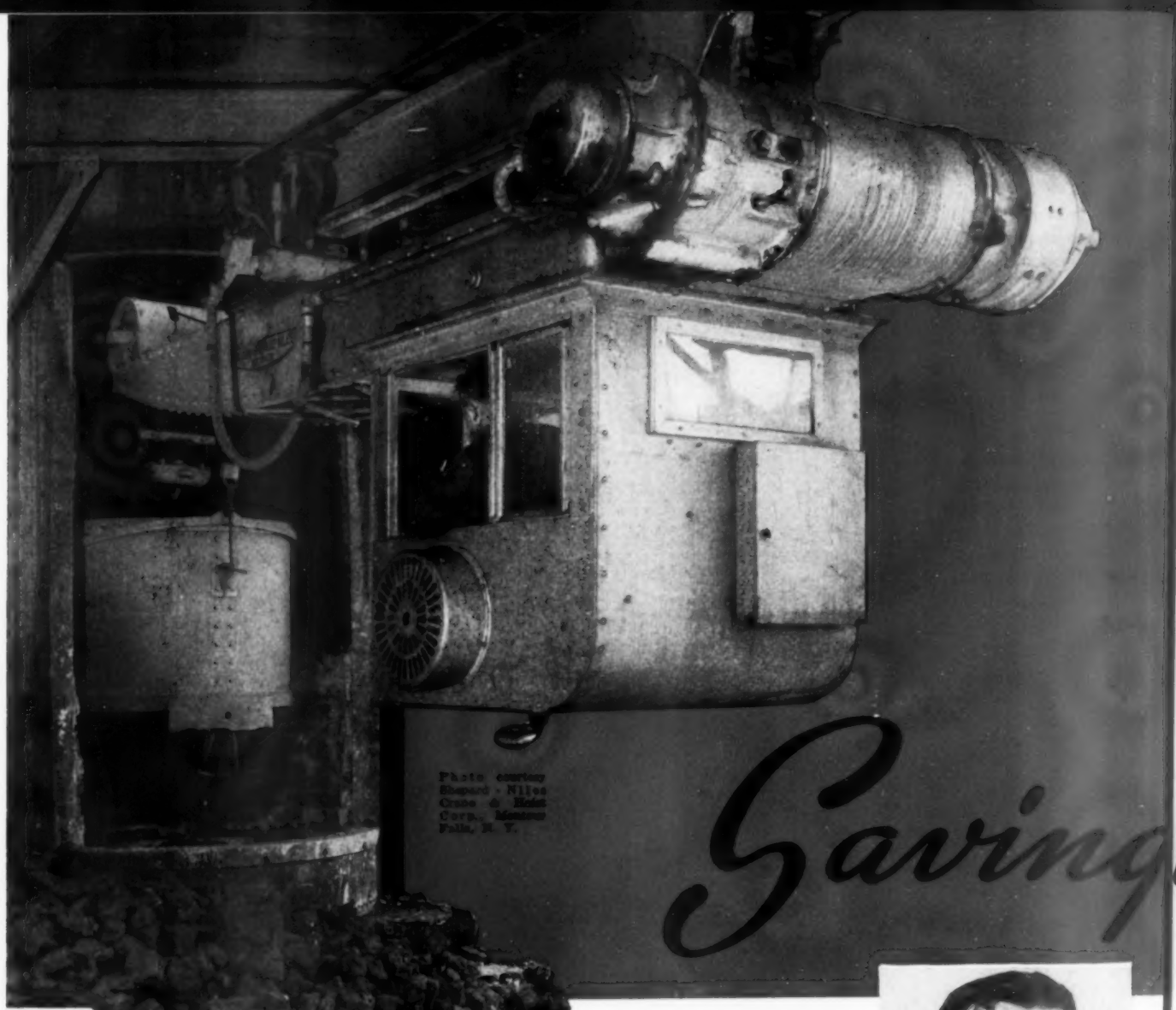
Below—Ballroom of the Book-Cadillac Hotel was filled for the annual banquet Thursday evening concluding the convention



Saving

By J. A. BOWERS
Melting Superintendent
American Cast Iron Pipe Co.
Birmingham

CONSERVATION of foundry coke has become of utmost importance since the quality of the material, at least in many instances, is not what it was prior to the war. In addition to this, there is a shortage of coke in most industrial localities. Lowering of coke quality aggravates its shortage because most cupola operators are forced to use more and more coke in attempting to maintain iron temperatures. In the following discussion of the problem the author has listed some ways that may tend to alleviate this condition. It is not claimed that any of the suggestions are original; they are given only as a review of some of the procedures that have been used to conserve foundry coke.

Supervision—Experienced supervision is of primary importance in any or all steps that might be taken to solve this problem. This means that supervisors of the cupola must be more than simply labor foremen. They should have a fair knowledge of the entire procedure of melting iron in the cupola, at least from a practical standpoint. They must also be alert and attentive at all times and willing to use all control mediums available constantly, to avoid the many troubles that can be encountered in any cupola operation where the amount of coke used is to be held to the barest minimum. A capable cupola operator constantly checking melting temperature, slag viscosity and appearance, melting speed, slight variations of blast pressure, etc., can predict and in most cases correct the operation in such a way as to avoid serious troubles and delays.

Coke Bed—The proper preparation of the bed, which includes the correct height, is most important to the operator endeavoring to save coke. The coke in the bed

should be properly fired from that resting on the sand bottom on up the stack. It should be brought level at the correct height, that is, the desired number of inches above the tuyeres, before introducing any metal charges into the stack. In some foundries—as is the practice in the author's foundry—a cherry red bed is prepared up to within 8 or 10 in. of the desired total bed height, and this difference made up with fresh or green coke. It is best for each foundryman to determine the proper height of the bed in his cupola operation, since most foundries have their own peculiar shop problems and difficulties.

Bed height is important in order to avoid dull iron at the first of the heat, thereby causing excessive scrap or an unusual amount of pigged iron in the case of a low bed, or a useless waste of coke in the case of an excessively high bed. Of course, it is considered good practice to begin with the bed somewhat higher than thought necessary and slowly decrease the height from day to day until the iron temperature indicates that no more reduction in fuel is safe. It is highly recommended that the bed height be checked daily with a measuring device from the charging door, rather than to depend on the weight of coke charged. All cupola bed measuring devices should be checked at least three times weekly. These metallic

Foundry Coke

measuring devices naturaly are subjected to rather high temperatures during the actual operation of measuring the bed and, therefore, stretch rather rapidly. The author has seen bed measuring devices, thought to be correct, that were 24 in. longer than they should have been, thereby giving a coke bed 24 in. too low and leading to many troubles.

Weight of Metal Charges—By trying to save coke in cupola melting it often proves helpful to know the maximum weight charge for that particular cupola. At first glance this may not seem important but, generally speaking, most cupolas are not operated with the maximum weight charge. This fact often can be used to advantage when reducing the coke in the coke charge. A minimum is reached where large areas would be left void of coke across the section of the cupola, and in such cases it would be better to increase the iron charge rather than reduce the coke charge. This practice is followed in the author's foundry where the iron charge is increased from 2000 to 2500 lb for the last half of the day's run in a 48-in. cupola. In any discussion concerning the charge weights it is, of course, assumed that every cupola operator endeavoring to save coke not only knows the proper weights of each material going into the charge but actually and carefully weighs them.

Cupola Charging—We consider it necessary to charge the cupola properly and evenly in face of considerable evidence that the charges become mixed in their descent down the stack. This is easily understood if we assume a highly exaggerated condition, such as charging all the coke on one side of the stack and charging the iron level. Assuming such a condition, considerable coke would be wasted on one side of the cupola and the iron highly oxidized on the other side. Results of such a condition will, of course, mean off-analysis iron, lack of temperature, excessive erosion of the lining, which could cause a highly viscous slag, thus demanding more flux which, in turn, calls for more coke to melt it. If the cupola is charged with mechanical charger, this equipment should be checked frequently to insure proper distribution of the raw materials in the stack.

Make-Up of Metal Charge—If it is possible, a better selection of the raw material making up the metal charge will help save coke. It is not difficult to visualize how much harder it would be to melt a 6-in. cube of steel than a piece 2 x 6 x 18 in., although they both have the same cubical content. We, of course, realize that metal too thin in cross section—particularly that with a large surface area—is not desirable. It should be pointed out that all pieces of scrap that are too long must be avoided in order to insure the operator against bridging in the stack, thereby burning out and wasting the coke between the bridge and the tuyeres. The general rule with reference to maximum length of material used by most cupola operators is that no pieces should be used that exceed the radius of the cupola.

To save the maximum amount of coke in cupola melting, a minimum amount of steel scrap should be used in the charge and yet have sufficient to meet the desired physical specifications. This is true because the more steel used in the mix, the more carbon will be absorbed by the metal from the coke which, in turn, leaves less fuel to melt and superheat the metal. It might be well, while on this point, to mention the fact that published data support the claim that fine steel turnings can be successfully substituted for part of the coke charge without any detrimental effect on the metal temperature at the spout. This has never been tried in the author's foundry. We have, however, melted fine steel turnings in a brick-lined hopper continuously without any further fuel once the turnings have been started melting at the small end of the hopper. This may be one possible way to save coke in cupola melting but, if attempted, should certainly be done slowly and cautiously.

Manipulation of the Blast—If we are to save coke in cupola melting, we must keep as near as possible the proper balance between the air forced into the tuyeres and the amount of coke in the charge. We must also avoid as much as possible any drastic changes in the amount of air being forced into the stack. We have found that when the amount of air going into the cupola is increased drastically and decreased at frequent intervals—which of course results in increasing and decreasing the depth of the melting zone—we invariably run into dull iron. Naturally, when any cupola operator encounters dull iron the first move he makes is to increase the coke. It is an unwritten law in the (*Please turn to page* 258)

This discussion of fundamental principles involved in production of satisfactory cores is from a paper presented by the author during the recent lecture course conducted by the Chicago Chapter of the AFA

BEFORE we elaborate on the functioning of cores, sands and binders in the foundry, it would be best to define our subject. The word "core" comes from the Latin word "cors" meaning "heart" and, therefore infers that, in foundry practice, the core is the heart of the casting. It is that *portion of the mold*, separately made, and inserted for shaping some part of a casting. The mold represents the completed body or mass which contains the cavity and the core assembly.

We now come to the word "sand." Contrary to popular belief, sand is not always composed of quartz but may be made up of any loose material consisting of small but distinguishable grains resulting from the disintegration of rock. Zircon, the same element found in precious gems, is used in many foundries in the form of zirconium silicate for special types of sand cores.

A binder is a material which causes *cohesion*. We use the word "cohesion" instead of "adhesion" despite the fact that they are synonymous, since cohesion infers *sticking together* while adhesion suggests *sticking to another object*. If an unbaked core sand mixture coheres properly it will show a normal compressive strength. If the mixture adheres, the compressive strength will be low and the sand grains will stick to the pattern instead of to themselves.

An ideal base core sand for foundry use occurs naturally in Illinois, this being the famous deposit of Ottawa silica sand derived from the St. Peter sandstone of Ordovician age. During that geological era, the sea submerged all of this territory now underlaid by the St. Peter sandstone deposit. The source of the sediment was the crystalline rocks to the north, and through natural processes of erosion the disintegrated rock particles were laid down and cemented together under a shallow sea. In fresh exposures the St. Peter sandstone is usually a glistening white color but it weathers to a light brown, probably due to iron oxide staining. It contains from ½ to 1 per cent clay, which is easily removed by washing. Chemical analysis reveals the sandstone to consist of more than 97 per cent SiO_2. In the deposit of the upper Midwest, a screen analysis of this round-grained Ottawa sand shows a grain fineness number ranging between 50 and 65 with most of the grain retained on the 50, 70, and 100 mesh screens.

By O. JAY MYERS
Director of Foundry Research
Werner G. Smith Co.
Division of Archer-Daniels-Midland Co.
Minneapolis

Suffice it to say that there are literally thousands of sand deposits scattered all over the globe which are potentially available for foundry work. On the other hand, all sand formations are not suitable for core sand mixtures. The presence of excessive impurities (consisting of easily fusible minerals) prevents some deposits from being worked for the foundry. A high percentage of clay or silt also detracts from the usefulness of a core sand in that it is difficult to formulate an economical core sand mixture from a base sand of this type. The Ottawa sand, when washed and dried, consists of nearly pure round-grained silica having all of the attributes conducive to good foundry practice.

A good basic core sand can lose all of its optimum properties if it is not properly formulated into a sound, economical sand mixture. A good core sand mixture, first

Cores ... Sands ... and Binders

of all, must be workable. This term has not been defined in general practice because it is a combination of many green physical properties of the mixture. A workable core sand mixture must be flowable. There is no absolute method of measuring flowability available to the foundryman. One may obtain an indication of flowability by the use of a flowability meter attached to an AFA standard sand rammer but this gage merely indicates the comparative movement between two core sand mixtures under the same degree of impact. The most flowable common material we can think of is water. When poured into a cavity it will search and reach every available corner and crevice. Pure, dried sand is the closest approach to 100 per cent flowability we have in the foundry. If pure sand be poured into a corebox it will fill the corebox completely but as soon as a small amount of water is added to the sand mixture the flowability is decreased considerably (until enough liquid is added to form a slurry). Why, then, is water added to a normal core sand mixture? It is placed in the formulation to increase cohesiveness between the sand grains (either by its own surface tension or by reacting physically with another material) to form what is technically termed green bond. This green bond or cohesiveness is another prerequisite of a workable core sand mixture.

The most widely used sand addition agent for procuring green bond in core sand mixtures is cereal binder. The only real function of a cereal binder, in a core sand mixture, is to increase the cohesiveness between the individual sand grains before baking. A cereal binder will not function economically if no moisture is used in the core sand mixture. Water reacts physically with the starch in the cereal binder, causing it to swell and become sticky, much like library paste. This stickiness holds the sand grains together and prevents their adhering to the pattern. Presence of the finely divided cereal binder also adds a certain percentage of fines to the mixture with potential attendant better surface finish on the casting.

In order to get maximum dispersal of a dry cereal binder with a dry base core sand, these two ingredients must be intimately mixed together before any other additions are made. With an efficient mechanical muller, not over 1 per cent by weight of a good cereal binder need be used. The time for mixing the sand and cereal binder together depends primarily on the type of mixing equipment available as well as the grain size of the sand and the density and amount of the cereal binder. The minimum dry mixing time is a difficult point to establish but the maximum mixing time is much more definite. If the cereal binder tends to coat the bottom or sides of the mixer, the sand and binder have been mixed together too long. If the cereal binder is dense and the base core sand coarse, the dry mixing time must be reduced to a minimum. If the core sand is fine and the cereal binder light, much longer dry mixing times are necessary.

We have stated before that cereal binder will react with the moisture in the sand mixture. In order to obtain intimate contact between these two ingredients we naturally should mix them together as soon as possible during the mixing cycle. Water is, therefore, next added to the core sand containing the dispersed cereal binder. How much water do we need? This question can be answered only if the following facts are known.

1. The *grain size* of the base sand.
2. The *amount and type* of cereal binder in the mixture.
3. The *type* of mixing equipment available.
4. The *size and shape* of the cores produced.
5. The *average bench life* of the core sand in the foundry.
6. The *maximum allowable mixing cycle* so that the coremakers will always have sand available.

Determine Water Content

The real answer to the question can be stated simply thus: You need as much moisture as will give a workable mixture with the amount of cereal and type of sand in the muller. Let us remember that workability means both *flowability* and *green strength*. Let us also consider that a very flowable core sand mixture has very little green strength and also that too weak a mixture means stickiness. One can readily see that the moisture content of an unbaked core sand mixture is a delicate problem despite the fact all of the moisture is lost during the baking cycle.

The best method of getting to the bottom of this problem is to keep as many variables constant as possible and attempt to evaluate the green strength of the core sand mixture. Variables over which control is possible are: Amount and type of sand and binder used, the mixer itself and the *maximum allowable* mixing cycle. Starting with a constant formula and mixing cycle, varying amounts of moisture, from 1 to 6 per cent in 1 per cent increments, should be added to separate core sand mixtures. Each mixture should be tested for green bond and that percentage moisture which shows the highest green bond is the correct moisture content to use for that mixture.

If the sand is not flowable enough, it is best to reduce the amount of cereal binder in the mixture rather than readjust the moisture content. Since the addition of core oil usually reduces the amount of potential green bond and hence increases the flowability of a core sand mixture, the reduction of the cereal binder should not be attempted until after the complete mixture has been made.

It is, of course, always possible to over-mull a cereal bonded core sand mixture, but (*Please turn to page* 192)

Casting

Fig. 1—Finished mold ready for pouring. The casting is fed from the bottom

Fig. 2—Large mold being filled by crane ladles. Operator with stick is removing slight dross accumulation

Fig. 3—General view of foundry floor. Two crucible type melting furnaces are at rear. Center foreground shows mold being poured, to the left a mold is being prepared for pouring, while at right a reducing flame is being played on a poured mold to retard solidification

Fig. 4—Ferrous insert positioned in mold preparatory to casting. Note six anchor bolts

By S. MENTON
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Zinc Alloy Dies

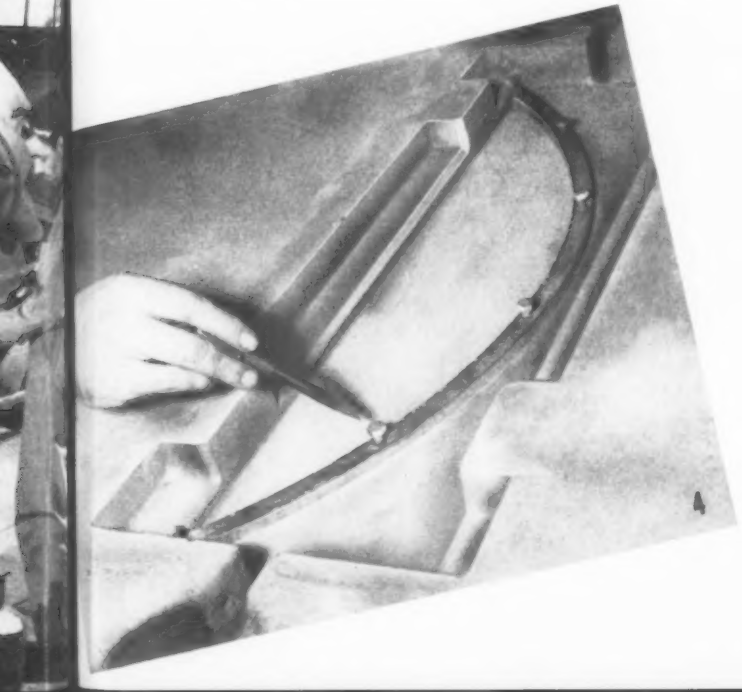
Successful use of nonferrous die materials by the aircraft industry during the war has interested the automotive industry in their use for dies to form steel stampings in quantities far beyond previously accepted limits. Foundry practice followed in casting such dies is detailed here

LONG-STANDING prejudices against short-run nonferrous die materials in the production of steel stampings for automobiles have been tempered by the success achieved by the aircraft industry during the war in shaping aluminum alloy elements on zinc alloy dies in presses and drop hammers.

The appreciable cost savings accruing from the excellent casting properties of that type alloy, together with ease of polishing, machining and welding, good abrasion resistance, self-lubricating properties, reasonably good physical characteristics and the readiness with which it may be remelted and reused, have stimulated research and development on the material for dies to form steel stampings in quantities far beyond previously accepted limits. Pioneering in this work, engineers of the General Motors Overseas Operations, in co-operation with the Fisher Body Division, have assembled comprehensive data on the entire procedure.

The nominal composition of one zinc-base alloy sold under the trade name Kirksite A is as follows: Al 3.5-5 per cent; Cu 4 per cent; Mg 1 per cent max., and Zn remainder. Tensile strength of sand-cast Kirksite A is 37,800 psi with 130 bhn after cold quenching. Its melting point is 717 F.°

Use of the open-mold method of casting Kirksite has proved to be the most satisfactory way of insuring sound, smooth dies.



In the open-mold method, flask and bottom board represent the most important items of equipment in the molding operations proper, as successful molds depend on their strength and rigidity. Both wood and steel are used in their manufacture and if wood is used, it is vital that the sections be of heavy lumber, joints mortised, bottom boards reinforced and trussed, and flasks braced by through-bolts.

Trunnions placed at the center of the flask ends are essential with molds of any appreciable size, both to assist in rolling over and to avoid cracking the mold while turning it over. Steel clamps to hold the flask to the bottom boards are much better and safer than C clamps and wooden wedges.

In regard to molding sand, authorities agree that it casting Kirksite a fine grain sand, with low moisture content is necessary. While some say that little if any binder is necessary, others advocate up to 30 per cent. With less experienced operators sand with a clay content of from 25 to 30 per cent is preferable. Molding sand grain size should be approximately uniform to avoid packing and afford maximum voids for venting.

In molding, the pattern is laid on the bottom board with the contours of the punch or die facing upward. The flask is located to provide a minimum clearance of 3-in. around the pattern. Usually, a greater clearance is preferred, not only to prevent the metal from running out at the time of pouring, but also to provide space for the pouring gate.

When the flask has been rammed up to the point that the depth of the sand reaches the uppermost point on the pattern, provision is made for pouring the alloy into the casting cavity by means of a gate through the mold. Only one is required unless there are two deep sections in the pattern which are not connected by a sufficiently large channel through which the metal can flow. In such cases, two openings are provided so that the metal can be poured simultaneously from two ladles. Pouring sprue is formed by a cylindrical tube or gate pin 1¼-in ID and of the proper depth located at least 3½-in from the pattern.

A channel or runner of the same diameter is cut into the sand from the sprue opening to the high point on the

pattern and covered with a flat baked-sand core. This protects the runner from deformation while the remainder of the flask is filled with sand and rammed. No provision need be made for venting except in the case of deep dies. No gases are produced by the alloy but steam from the sand may cause rough spots in the bottom of the deepest dies if not vented.

When the mold has been completely rammed up, excess sand is struck off with a straight edge or bar of angle iron, level with the upper edges of the flask walls. A bottom board is clamped in place and the mold is rolled over by hand or by a crane. The clamps and the board which formerly was on the bottom are removed and the flask is leveled up with wooden wedges. Leveling is essential if the correct relation of the casting base to the contour is to be obtained with a minimum amount of machining.

To provide a head of molten alloy to assure a continuous, even flow into the die cavity, the sprue mouth is enlarged before the pattern is removed from the mold. This operation consists in cutting the sand away to form a wide shallow, half-round funnel—the flat side being parallel to the pattern and the rounded portion being cut back toward the side of the flask. In open mold casting, the funnel may be from 3 to 6 inches in depth depending on the size of the casting.

Before removal of the pattern, any loose sand is brushed off and the sand around the pattern slightly beveled with a slick. The edge all around the pattern is swabbed with water and slicked, and the pattern rapped lightly to free it from the sand. The pattern then is lifted vertically from the mold either by lifting bars fitted with adjustable hooks or preferably by a crane.

After the pattern is removed from the sand, the mold face is sprayed with molasses water. All necessary re-

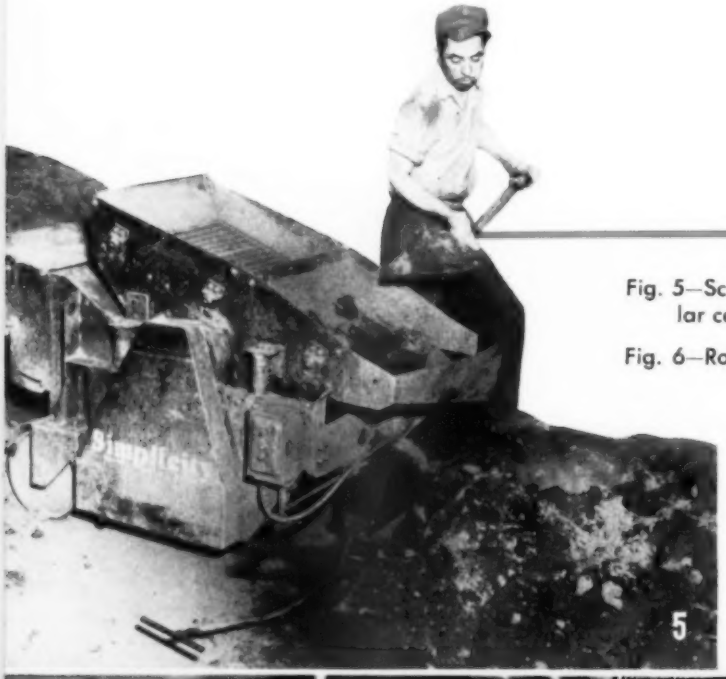
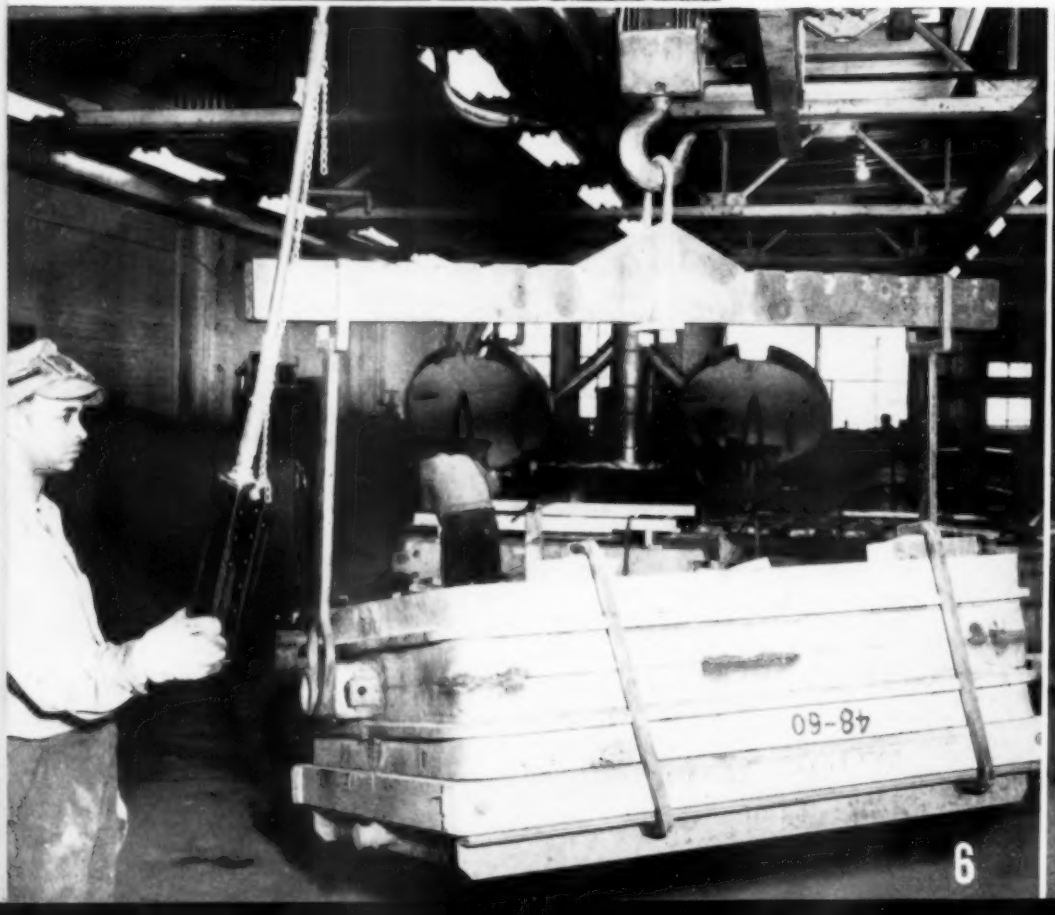


Fig. 5—Screening and mixing molding sand in a portable unit. Particular care must be given to cleanliness of sand for good castings

Fig. 6—Rolling over the rammed flask with a crane yoke attached to trunnions on flask

Fig. 7—Using torches to keep large poured casting in molten state until heavier bottom section solidifies. Steel frame is used to hold core in the open mold

Fig. 8—First step in removing pattern with the help of an A-frame and chain fall. Patterns with little or no draft have been removed successfully



pairs then are made and any loose sand is blown out or removed by a sand suction pump. The mold is skin dried with a blow torch, dusted with talc and is then ready for casting.

Steel inserts often are used to provide greater strength or wear resistance at certain locations. Such inserts may be located on the original pattern, or, as more frequently happens, the mold may be cut out to allow their proper positioning, as shown in Fig. 4.

Projections, undercuts and vertical walls without draft, of course, will not permit the pattern to be withdrawn from the sand without damage to the mold, making the use of cores necessary. Core sand is a blend of bank and sharp sands in a proportion of two of bank to one of sharp. The recommended grain size is 150 to 180 mesh for the bank sand and 150 mesh for the sharp sand. A moisture content of 2 per cent in the blend will be found to give the best results.

A common binder combination in use consists of 2½ per cent cereal binder and 0.5 per cent core oil (all by volume). Baking temperatures range from 350 to 375 F and under no circumstances should exceed 400 F. The baking time is from 3 to 4 hours, depending on size, and large cores may be allowed to remain in the oven overnight to assure thorough baking.

As the top of the mold is completely open, an auxiliary device is necessary to hold and align cores which are not located by core prints. This consists of a structural iron framework made up of two longitudinal and a number of slotted transverse members, complete with plates for holding the cores in position. These should be sufficient in number to hold the cores securely. The cores are secured to the frame by means of arbor bolts molded directly into the cores. The completed assembly is placed in position over the cavity in the mold and clamped with U-bars and wedges. After carefully checking to insure that the cores are properly aligned, the mold is filled in the usual manner.

Too much stress cannot be given to the melting and pouring of Kirksite. The alloy is melted in cast iron pots heated by gas or oil with some form of temperature control. While melting pots may be of any size and shape, the alloy can be melted and maintained at a uniform temperature throughout with the least amount of fuel if a shallow, circular, bowl-shaped pot is used. For the most part, local hot spots or overheated zones together with localized attacks on the pot walls and resultant contamination, are avoided in pots of this shape. Temperature changes are slower and heat losses are less if the pot is of ample capacity, at least sufficient to cast the largest die anticipated without using more than two-thirds of the melt.

Importance of some form of heat control cannot be overemphasized. Temperatures approaching the melting point result in segregation of copper-zinc compounds, while high temperatures cause the alloy to attack the melting pot and become contaminated. In either case, the physical characteristics will be affected adversely and the melt may be ruined. Also, normal pot life will be shortened drastically. Melting units should be of the tilting type from which the alloy may be poured into ladles suspended from an overhead traveling crane.

Cast iron pots are much more resistant to the solvent action of Kirksite than those of fabricated steel, and those made of Meehanite have been found to give good service. Pots of the following analysis, for instance, have proved quite satisfactory in service: C 3.00-3.50 per cent; Si 1.00-2.00 per cent; Mn 0.60-0.75 per cent; Ni 2.00-2.50 per cent; Cr 1.10-1.20 per cent, and Mo 0.40-0.60 per cent cent.

(*Please turn to page* 267)

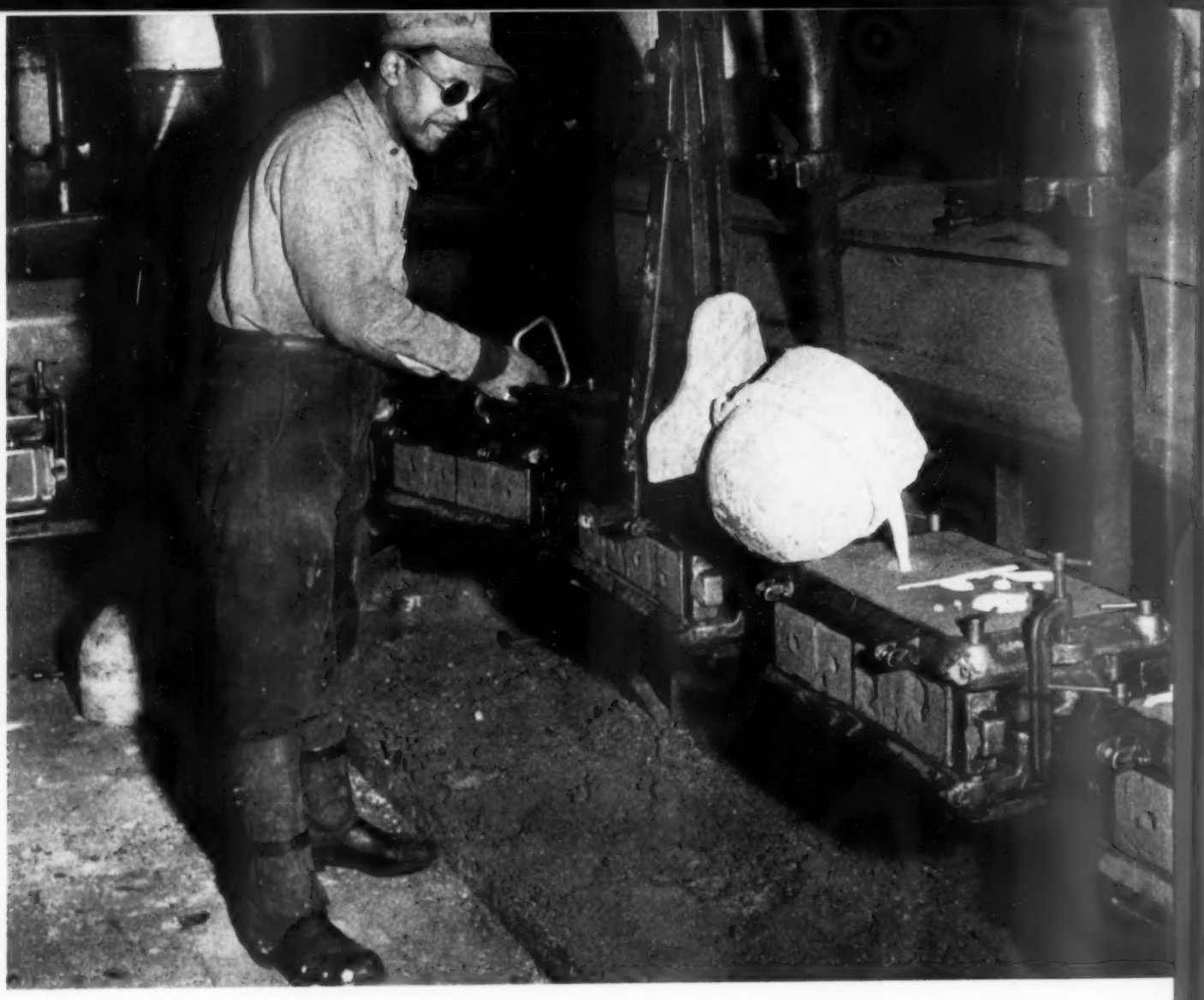


TABLE I—Compositions and Properties of Sand Mixes Used

SERIES	Composition	CORE SAND MIXES: Binder to Sand Ratio By Volume		Moisture Percent By Weight		Permeability		Compression Strength Lbs. per Sq. In.		CORE PROPERTIES AFTER BAKING: Permeability		Tensile Strength Lbs. per Sq. In.	
		From	To	Fr.	To	Fr.	To	Fr.	To	Fr.	To	Fr.	To
I	No. 50 Silica Sand Raw Soy Bean Oil Water	1-100	1-30	2.6	2.5	75	67	..	.	88	88	83.0	188.5
II	Bridgeport Sand Raw Soy Bean Oil Water	1-20	(only one mix in this series)	2.8		46		90		54		192	
III	No. 50 Silica Sand Wheat Flour Water	1-20	1-4	3.8	4.3	58	25	65	140	70	36	77.5	125
IV	No. 50 Silica Sand Pitch Water	1-10	1-4	2.5	4.0	73	42	99	117	99	80	52	74
V	Lake Michigan Sand Raw Soy Bean Oil Water	1-100	1-30	2.8	2.5	193	151			235	198	52	222
VI	Lake Michigan Sand Wheat Flour Water	1-20	1-4	2.6	4.3	126	36	50	128	173	82	71.5	103
VII	Lake Michigan Sand Pitch Water	1-10	1-4	3.8	4.0	134	75	50	113	198	173	44	58.5

By MAJ. DONALD M. BACHELOR
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Why Metal Penetrates CORES and MOLDS

IT IS well known that gases and their reactions are responsible for a large percentage of the defective castings produced by the foundry industry. It is the purpose of this article to demonstrate that the use of iron oxide and similar oxides controls gaseous reactions in sand molds and cores and thereby prevents metal penetration.

From time immemorial the foundryman has been confronted with the problem of producing a core and mold that would withstand the intense heat and pressure of a large mass of molten metal until a sufficient skin of metal had solidified. In most cases a core was supposedly made impervious to metal penetration by (1) using a more refractory material in the core, such as washed silica sand, (2) filling the voids between the sand grains with a fine material like silica flour, or (3) applying several coats of a refractory wash. Any one or a combination of the above methods was not entirely satisfactory and, especially in the case of cores surrounded by several inches of metal, it became necessary for the cleaning room to remove the fused mass of sand and metal resulting from core inability to meet requirements.

A few years ago, a foundry producing alloy gray iron diesel crankshafts—approximately 2300 lb finished weight—was troubled with metal penetrating so deeply into the 4-in. diameter x 12-in. long link cores in the throws of the crankshaft that over 100 man-hours were required to remove the fused iron and sand from the cored holes in the throws of one crankshaft. An analysis of the hard fused material in the cored hole revealed one-third iron and two-thirds sand. The link cores, which were composed of silica sand, silica flour and soy bean oil, were coated with silica flour wash as many as four times, with a thorough drying after each coating—but the metal still penetrated as deeply as before. At this point the author was assigned the problem of conducting sufficient research in order that a link core might be produced in such a manner that no metal would penetrate it.

Obviously, an inferior core wash could not have been responsible for admitting the amount of metal that had entered these cores. Therefore, attention was focused on the ingredients and structure of the core itself. As a starting point, it was decided to choose two sands and three binders as the variables, all other conditions to be held as constant as humanly possible. The two sands selected were Lake Michigan sand and washed No. 50 silica sand; the binders were raw soy bean oil, wheat flour, and pitch. Inasmuch as two castings were poured with Bridgeport sand, its screen analysis is included with those for Lake Michigan and No. 50 silica sand. (See Table II.)

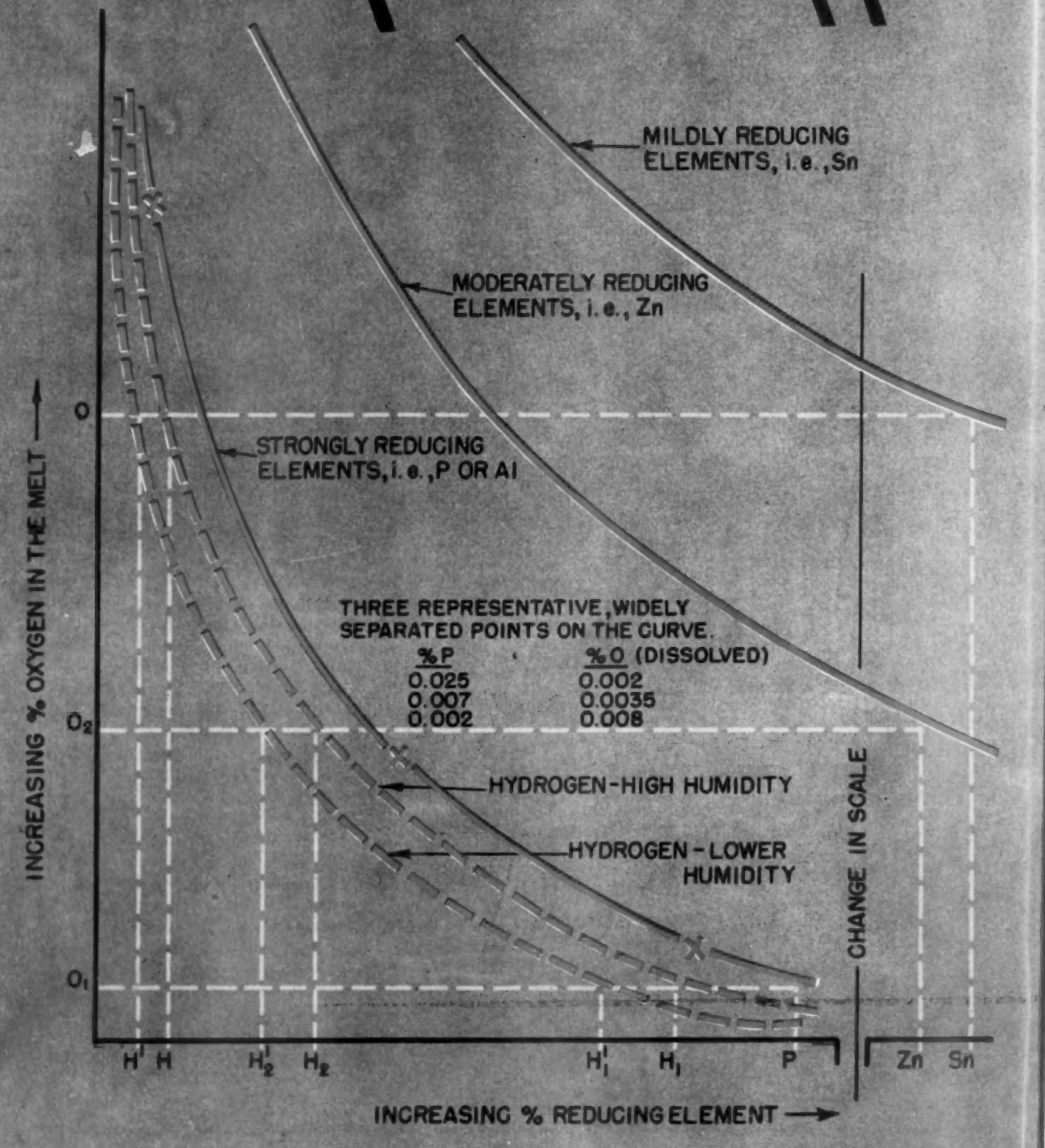
The cores were rammed in a cylindrical box with a 10-lb weight dropping a distance of 2 in. as the ramming force. The cores were 3 in. long, were vented longitudinally in the center, and had three wires running the length of the core for support. The cores were baked in a ventilated oven at 375 F for 2½ hr. These cores were printed 1 in. deep in the mold leaving a core 2 in. high and 2 in. in diam projecting from the bottom center of the mold.

The mold was 6 in. square by 4 in. deep and was gated at one bottom corner with a vertical knife-edge gate ½ in. wide and 1 9/16 in. high. The gray iron pouring temperature was held as closely as possible to 2700 F and the metal composition was held as constant as possible for these tests. Therefore, the only variable was the composition of the core itself. Table I shows the ingredients (*Please turn to page* 235)

TABLE II—Analyses of Core Sands

Screen Analysis Mesh No.	Lake Michigan Sand Per Cent Retained By Weight	No. 50 Silica Sand Per-Cent Retained By Weight	Bridgeport Sand Per Cent Retained By Weight
20	0.3	0.1	0.0
28	1.3	0.3	Trace
35	8.4	0.4	0.1
48	39.9	7.5	0.2
60	23.6	9.6	0.2
65	15.6	13.8	0.8
80	7.0	21.6	4.0
100	2.1	20.6	16.7
150	0.7	12.5	24.2
200	0.8	11.7	44.6
270	0.1	1.1	4.1
PAN	0.2	0.8	5.1
Fineness No.	45	75	123
Distribution No.	0.74=2.85—1.37	1.57=4.49—1.46	1.13=2.53—0.70
Grain Class.	No. 6	No. 4	No. 3
AFA Clay Class.	A	A	B
Shape of Sand Grain	Rounded & Sub-Angular	Rounded	Angular
Base Permeability	178	58	48

THE THEORY OF Gases in Copper –



Base Alloys

By L. W. EASTWOOD
Assistant Supervisor
and
J. G. KURA
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This is the second of a series of articles based on investigations sponsored by the Non-Ferrous Ingot Metal Institute. The first article, discussing unsoundness caused by gases, was presented in the May issue

IT HAS already been noted that copper-base alloys vary considerably in their composition and in their chemical behavior because they may or may not contain strongly reducing elements. Consequently, the variations in the gas-metal system can be quite complex. It is desirable, therefore, to first consider some of the fundamental work done on copper-gas systems.

Oxygen in Pure Copper—Oxygen in copper forms a compound Cu_2O which has relatively high solubility in the liquid, and the cuprous oxide forms an eutectic similar to any other alloying element having limited solid solubility. This copper Cu_2O system is simple and well known. The Cu_2O in the copper Cu_2O alloy is stable and is not a source of unsoundness by itself unless, of course, it contacts a reducing substance such as hydrogen or a hydrocarbon. In tough pitch copper, which contains a nominal 0.04 per cent oxygen, the dissolved oxygen content is maintained with the equilibrium value of the hydrogen content, so that during solidification, Reaction A (THE FOUNDRY, May, 1947) occurs, causing enough generally distributed small voids to compensate for the shrinkage.

Hydrogen in Copper—The initial fundamental work on hydrogen metal systems was done by Sieverts and his colleagues[3, 4] around 1910 and later. They established the fact that the solubility of hydrogen in copper, and in many other metals also, is proportional to the square root of the partial pressure of the hydrogen over the melt. On the basis of the laws of mass action, the square-root relationship is taken to indicate that hydrogen is present in the melt either in atomic form or as a compound containing one atom of hydrogen. The substantial solubility of hydrogen in copper and copper-base alloys, as determined by Sieverts and his colleagues, has been frequently confirmed[5, 6, 7, 8], and the square-root relationship for biatomic gases, known as Sieverts Law, has been amply verified. At one atmosphere of hydrogen, copper dissolves 6 cc of hydrogen per 100 grams of liquid metal at 2000 F.

Probably an even greater contribution to the problem of gas unsoundness was made by Allen[9, 10, 11] and his associates, who showed that hydrogen and oxygen could coexist in a copper melt simultaneously. In other words, the hydrogen and oxygen were in equilibrium with H_2O in the melt, $2H + O \rightleftarrows H_2O$, or with the moisture in the atmosphere surrounding the melt. If the oxygen content of the copper melt increased, the hydrogen content necessarily would decrease and vice versa. The concentration of both of these reactants increases with the partial pressure of the moisture in the surrounding atmosphere, and all other factors the same, the concentration of the reactants also increases with an increase in melt temperature.

These principles worked out by Sieverts and his colleagues and by Allen have been generally applied to the more complex copper-base alloys.[12, 13, 14] Relatively recent investigations[8] have shown that the hydrogen solubility in tin bronzes follows the principles enunciated by Sievert and his colleagues, but the maximum hydrogen solubility decreases with increasing tin content. This decrease in hydrogen solubility with an increase in tin is of only academic interest because the hydrogen solubility, even with high tin content, is more than ample to produce substantial unsoundness. As shown by the data in Table I (THE FOUNDRY, May, 1947), the quantities of hydrogen required to produce unsoundness are very small.

Sulphur Dioxide in Copper—It has been shown that SO_2 dissolves in a copper melt in proportion to the cube root of the partial pressure of the SO_2 in the surrounding atmosphere.[7] This is theoretically sound and in conformity with the law of mass action. Thus, Reaction B, listed previously, is as follows: $SO_2 + {}_6Cu \rightleftarrows CU_2S + {}_2Cu_2O$. Each molecule of SO_2 in the copper is in the form of one molecule of Cu_2S and two molecules of Cu_2O and, hence, the concentration is pro- (*Please turn to page* 260)

Fig. 5—Data for oxygen/phosphorus equilibrium in 90:10 tin bronze has been obtained[22]

SPECIFICATIONS FOR Malleable Iron Castings

By JOHN E. LINABURY
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BEFORE the inception of any product, be it a harness buckle or a railway casting, there must first exist the desire, either real or imaginary, for that article. As the originator's mental picture takes form and size, he also visualizes other characteristics that will be required, such as strength, flexibility, machinability, cost, etc., in order that he may properly proportion the article to fulfill his desire. Frequently, some of these characteristics cannot be supplied entirely by any one material, and changes or compromises are necessary to satisfy the needs with available materials. Often in this development stage, before the idea is fully worked out, the form, size and material requirements will have changed many times. By the time the blueprints are ready and orders are to be placed, the consumer must have a definite knowledge of what to ask for, and these requests must be so arranged and modified that they can be written into a specification which is within the field that a supplier can fulfill.

Specifications—The writing of this specification of requirements must be given great care and consideration, if the best results are to be obtained. Any unnecessary requirement in the specification may increase the cost to the consumer and the difficulties of the supplier; while the omission of a single clause may result in the parts being totally unsatisfactory.

If the requirement for the article we desire came within the range of malleable iron characteristics, let us now consider what qualities we may reasonably ask for and expect the malleable foundry to supply.

Size and Shape—First, in malleable castings, what can we specify as to form and size? In weight, the range may extend from a fraction of an ounce, such as a small buckle, to heavy railway, marine or ordnance castings, weighing hundreds of pounds. The range in size is from small thin castings 1/16-in. thick to heavy sections up to 2 in. thick and several feet in length. Many foundries can supply larger castings. The consumer should not require castings that have abrupt changes in section, and where there is a change in thickness, it should be gradual. Above all, he must not expect the foundrymen to be able to violate the physical laws of nature as they apply to directional solidification and fluid and solid contraction in cooling. If the engineer conforms to the foregoing requirements in his design, he can ask for almost any shape that can be molded and drawn from the sand, but he must bear in mind that complication is very liable to add to his cost per pound.

For physical properties, the customer can find in malleable iron a long and favorable list of qualifications, but he should use them understandingly. He must not expect to find in the 2 x 2-in. section of the casting the same physical properties that he is able to get from a ⅝-in. diam cast test bar of the same metal. If the mechanical requirements of any section of the casting are critical, test should be made from material cut from that part of the casting requiring these properties, or better still, test the casting itself.

Mechanical Qualities—For tensile strength, malleable castings may be expected to compare with low carbon steel forgings with a minimum ultimate of 55,000 psi, an elongation of 18 per cent and a yield point of 36,000 psi. But if sections are small and the best machinability is desired, it may be advisable to get a metal with a little more carbon which has a yield point around 34,000 psi and 10 per cent elongation. This metal is about the most readily machinable of any ferrous metal. The brinell hardness usually runs from 115 to 135, increasing as the tensile strength increases and as the carbon decreases. It should not exceed 156.

When malleable iron is stretched or elongated, the reduction of area extends quite uniformly along the entire section being stretched, instead of necking in locally. This shows that its cohesion is more uniform and the stresses distributed over a greater area than with most ferrous materials. Because of this characteristic, the customer can depend upon his castings to be less subject to local failures than with various other kinds of metal. This, combined with its strength, makes malleable iron an excellent material for absorbing shock, and constitutes one of its most valuable characteristics. Its selection for use in automotive, railway and ordnance castings is an indication of this.

That its ability to stretch is combined with excellent stiffness is indicated by its modulus of elasticity of about 25,000,000 psi. Good castings can be depended upon to absorb shock within safe limits and resume their original shape; in other words, "they stay put." Unlike the grain structure of some metals which varies with the thickness of the section and the rate of cooling of the cast metal, the structure of malleable castings is changed by the anneal, and the as-cast condition is not quite as critical. Because of this characteristic, when the outer surface of the malleable casting is machined, the remaining metal can be expected to have practically the same physical characteristics as those of the outer skin. Consequently, a rough casting and a machined casting of the same section should have almost the same (*Please turn to page* 224)

Importance and Future of the FOUNDRY INDUSTRY

By GEORGE T. CHRISTOPHER
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Detroit

NEARLY everyone knows steel has been—and is—the biggest bottleneck so far in the production of automobiles.

So much attention has been focused on steel, as a matter of fact, that the general public and many of us in industry have overlooked the probability of still another serious bottleneck, once steel breaks. I refer to *castings!*

The average automobile contains 615 pounds of gray iron castings and 76 pounds of malleable iron castings. Castings go into automobile camshafts, brake drums, engine blocks, engine heads, manifolds, flywheels, clutch plates, radiator inlet-and-outlet fittings and shock-absorber parts. Without castings, in other words, there would be no automobiles!

This discussion of some of the current problems in the foundry industry was presented at the opening session of the American Foundrymen's Association 51st annual convention in Detroit, April 28

Most of the 5000 foundries in the United States claim they are operating at or near capacity right now. If this is true, the foundries cannot produce sufficient castings for the automobile industry to meet the demand for 5 to 6 million cars a year. The new foundries now being planned and built simply cannot produce enough additional castings to make up the difference.

I think the answer lies within the foundry industry itself.

I think the 5000 foundries can do much better than what they now think is capacity or near-capacity. I wonder, for example, just how many foundries are pouring iron 16 hours a day.

I believe that all of us who are vitally interested in foundries should take an objective inventory *now*. We're not going to solve our problems in the next month or the next year. It's going to take quite a while—possibly *several* years! The important thing right now, it seems to me, is to recognize just what's wrong—and then start out to correct as many of the defects as we can.

I'm going to outline some of the things I think are wrong in the foundry industry—not in any spirit of criticism, but in an effort to be helpful. We're all on the same team. We depend upon each other. Unless you succeed, we can't succeed.

Please let me make this point before I proceed any further:

We at Packard certainly do *not* pretend to have a perfect foundry, or even one approaching perfection. I'll be honest, however, and say I think the Packard foundry is much better than average. But we *know* we have a long way to go. We are trying to recognize our defects and correct them.

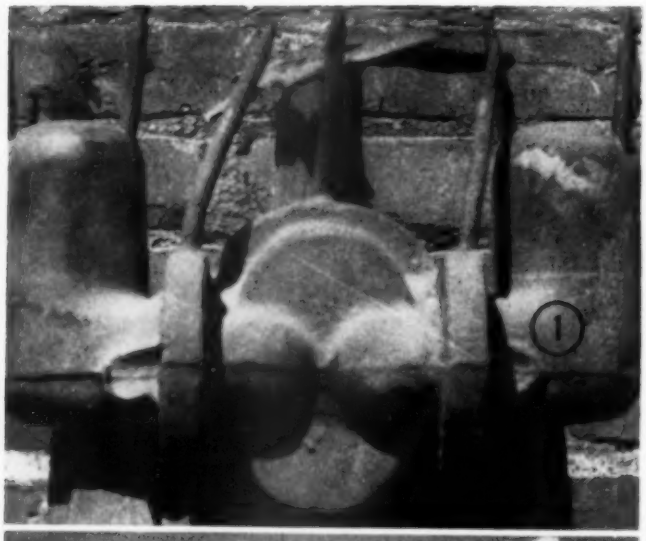
I've chosen as my subject, "The Importance and Future of the Foundry Industry," because I think we must take a new and *complete* look at ourselves.

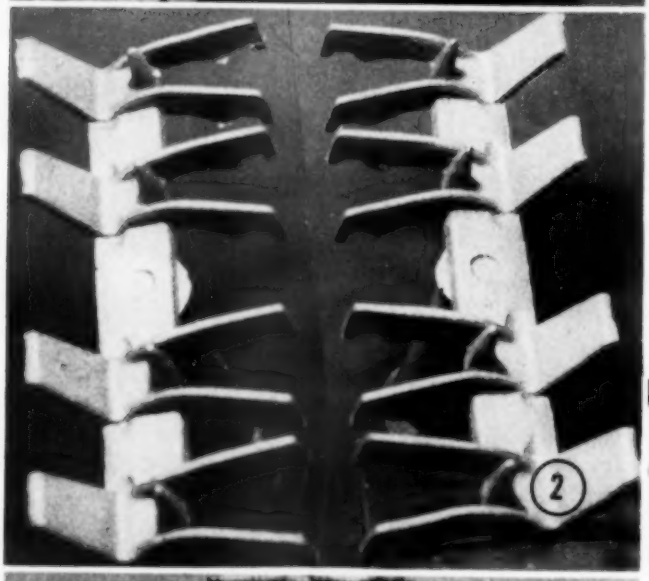
For too long, we've accepted the foundry industry as we do the weather. Castings are so common, and the industry so basic, that the foundry's importance to our national economy has been frequently overlooked. If there's any doubt in your minds about that, just ask yourselves whether the average person ever questions how castings are made—or where they come from.

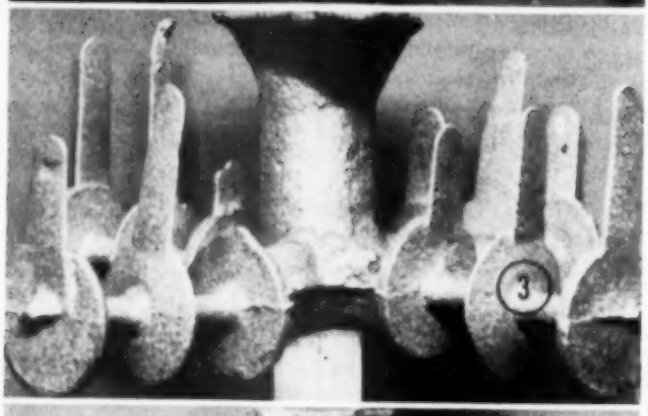
The importance of the industry has been overlooked not only by the general public, (*Please turn to page* 160)

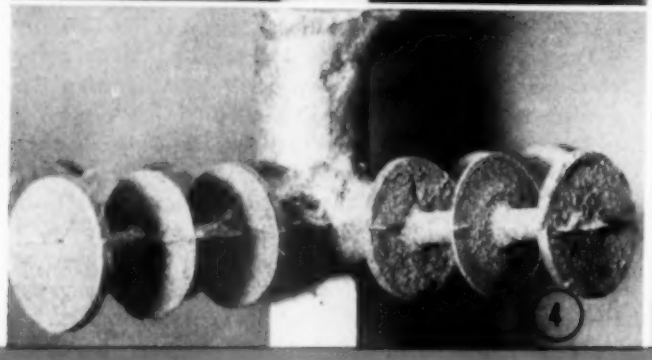
By J. RICHARD ADAMS
Vice President
Crucible Steel Casting Co.
Lansdowne, Pa.

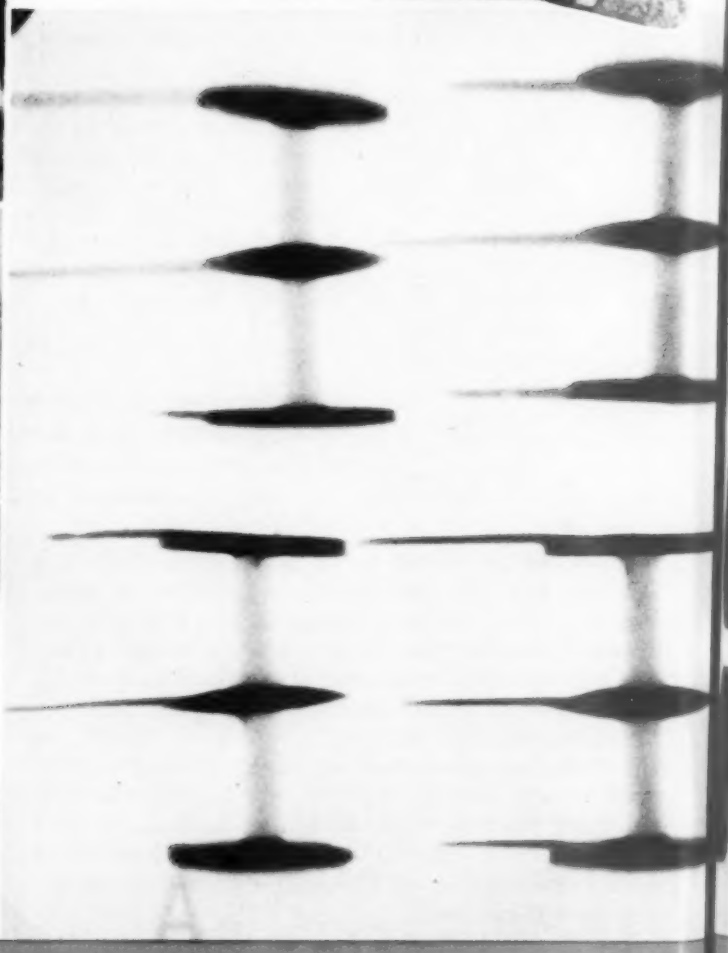
Should Molds B











Venting molds in production of steel castings serves no good purpose, according to the author. This paper was presented at the Tenth Annual Regional Foundry Conference of the Wisconsin Chapter, AFA, in Milwaukee

...ds be Vented?

VENTING of molds into which molten steel is poured has been practiced since the first steel castings were made. However, recent studies by a few foundries indicate that venting mold cavities in the production of steel castings serves no good purpose, and that long established convictions on the subject should be revised.

In the early twenties many steel foundries vented molds excessively. It was said to be necessary to maintain high permeability of both facing and backing sand in order to relieve pressure in the mold cavity when pouring and guard against re-entry of such gases into the steel—thereby producing a nonporous (pinhole-free) casting. At that time many steel foundries adopted various means in an effort to maintain permeability at about 200 AFA and over.

With today's knowledge of chemical reactions in the bath, steelmakers regard proper equilibrium of molten steel and slag as more effective than sand permeability in preventing pinholes. Even excessive moisture in green sand molds has proved to be only a minor factor in porosity.

Sand mixtures employed in making the first steel castings incorporated fire clays containing chemically combined moisture. Such mixtures were workable and had refractory qualities. The molds (*Please turn to page* 238)

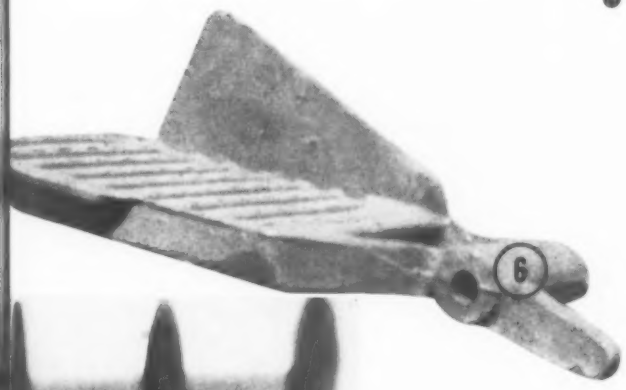


Fig. 1 — Small valve body showing conventional venting. This type casting now being made without vents

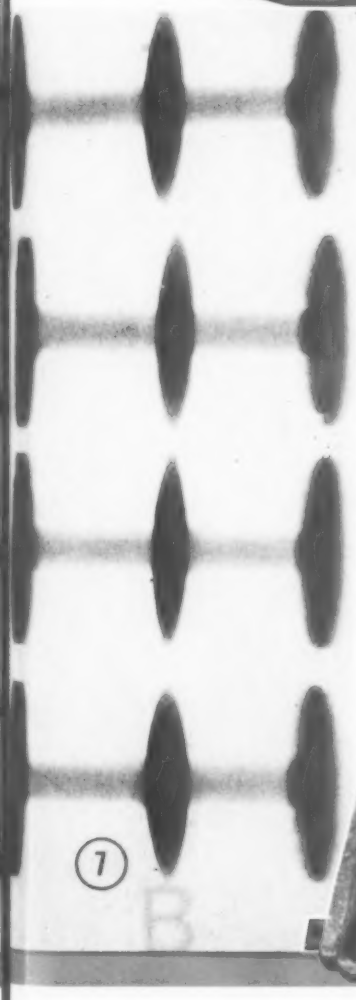


Fig. 2 — Drag view of four castings on gate, two pours in mold. No vents used. Casting weight 5 oz

Fig. 3 — Four chaplets provided with vents. These are 2½ in. long with 1¾-in. round heads at both ends, 3/32-in. section. Disks at centers taper from 3/16-in. section at stem to knife edge at outside 1½-in. diam

Fig. 4—Similar chaplets cast without vents

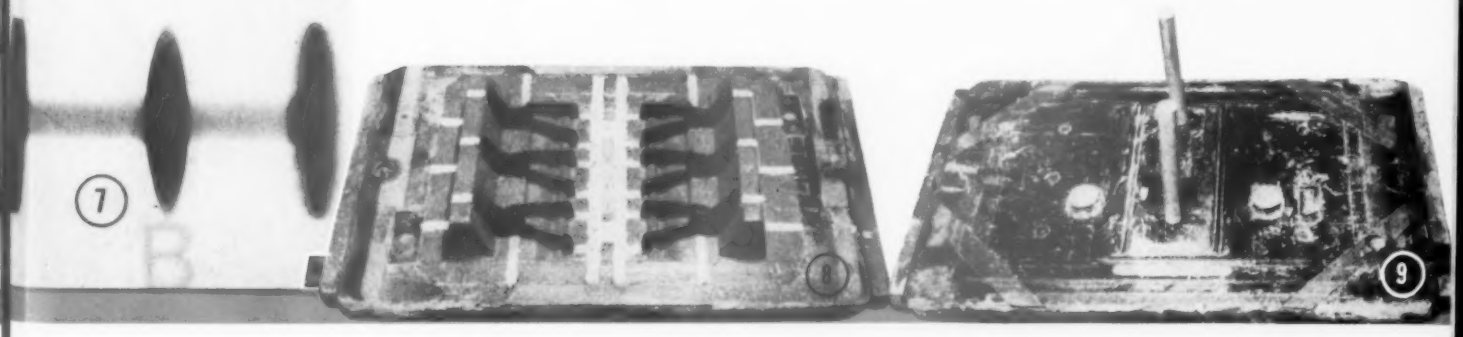
Fig. 5—Brake pedal, weight 20 lb, for electric truck. Formerly cast as shown here with 18 vents, flow-off and two risers

Fig. 6—Brake pedal cast after removing vents, flow-off and riser from top of foot guard

Fig. 7—Radiographs of chaplets cast with vents (left) and without (right). Note slight shrinkage at junction of center disk and stem

Fig. 8—Pattern equipment for brick cutting wire holders as received from another foundry. Three castings on gate, two pours. Note elaborate venting system provided with inverted leather fillets

Fig. 9—Cope side of pattern shown in Fig. 8 illlustrating where sprues are punched through cope. Note the two 1-in. dowel sticks rammed up in cope and positioned directly over venting system



Pours Engine Castings in DRY SAND MOLDS

By PAT DWYER
Engineering Editor
THE FOUNDRY

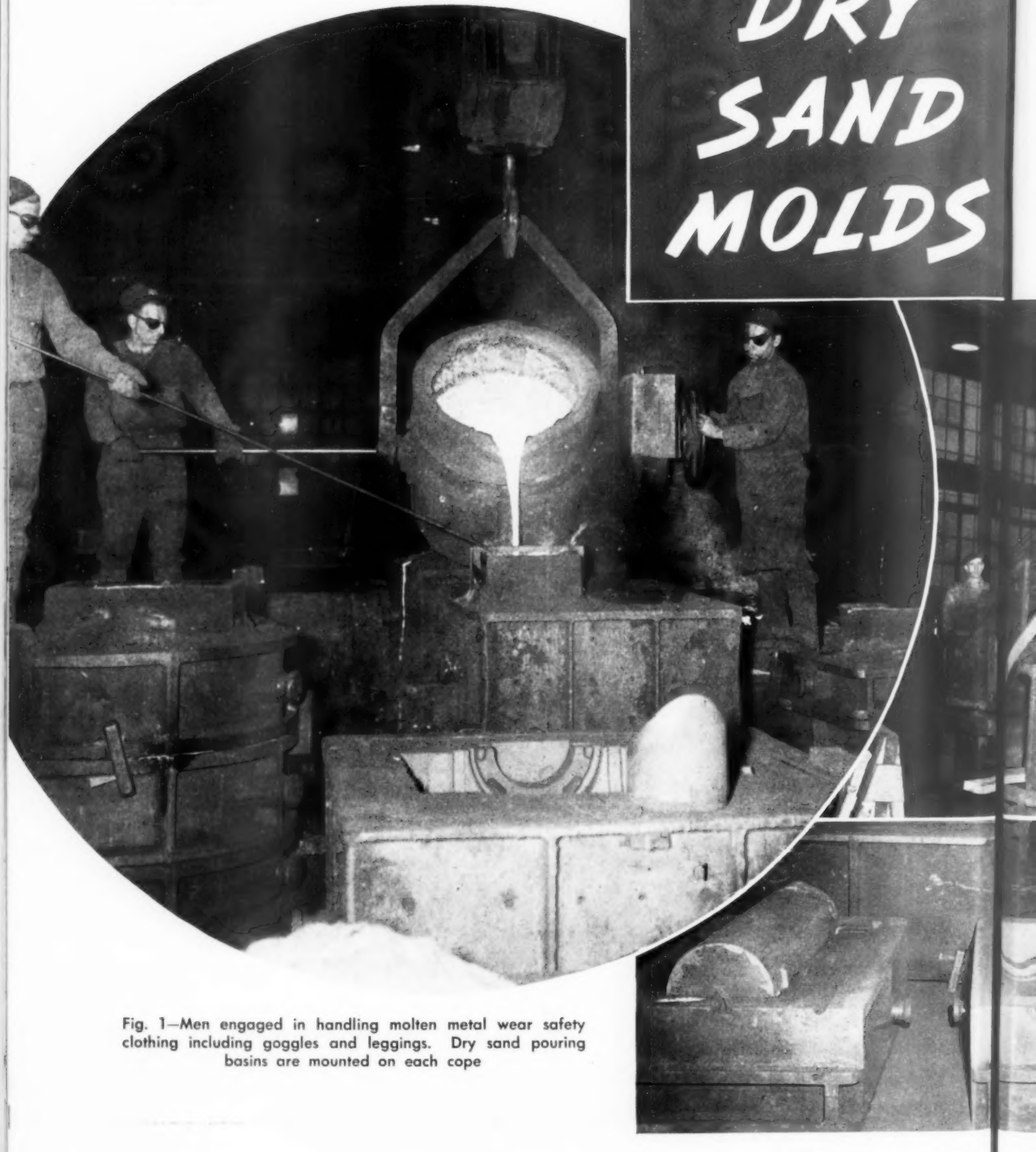


Fig. 1—Men engaged in handling molten metal wear safety clothing including goggles and leggings. Dry sand pouring basins are mounted on each cope

This is the second and concluding article dealing with foundry practice in the Franklin, Pa., plant of the Chicago Pneumatic Tool Co. The first article, presented in the May issue, described general features of the foundry

MANY years ago the foundry staff of the Chicago Pneumatic Tool Co., Franklin, Pa., solved the problem of providing pouring basins and insured the entrance of clean iron into the mold cavities. With from 75 to 125 molds on the floor, each one requiring a pouring basin, a considerable amount of labor and lumber was involved under the former method of providing green sand runner basins. Invariably the wood frames were burned or otherwise destroyed in a short time. In many instances the wood box served only once.

With the exception of small castings made in the side bay in green sand molds, all the other castings for diesel, oil and gas engines, air compressors and castings of a similar general character are made in dry sand molds. Experience over a long period indicates that the additional cost of drying the molds is more than offset by the reducton of hazard, and by the resulting increased yield of good castings. Molds are dried in three car type, gas or oil fired ovens in the north bay with tracks extending into the main bay where the cars are loaded and unloaded. One oven is 15 x 29 ft, 11 ft 6 in. high. Each of the other two, side by side, is 10 x 29 ft, 10 ft high.

Dry sand molds taken from the oven in the morning are very hot. Even after they are cored and closed they are still hot enough in the afternoon. Green sand basins built on these molds become dried and crumbly by the time the ladle arrives to pour molten metal into them. Permanent and satisfactory solution of the problem was found in the development of a dry sand runner basin that is self supporting and does not need either a wood or metal frame or casing. A description and illustration of the device by T. H. Beaulac, foundry superintendent, was published in the December, 1935, issue of THE FOUNDRY. It was one of three articles awarded honorable mention in a contest conducted by THE FOUNDRY under the title "How Some Foundrymen Solved Their Problems."

The pouring basin is in two parts, the rectangular basin

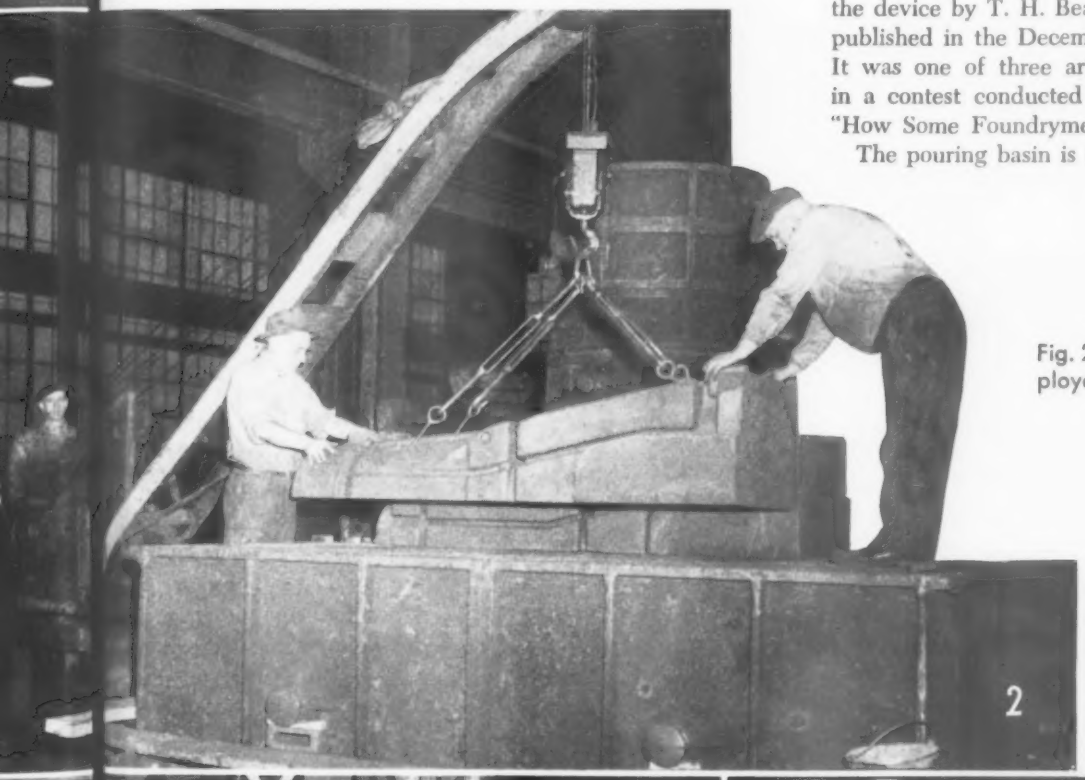


Fig. 2—A truck type jib crane is employed for placing large cores in some molds

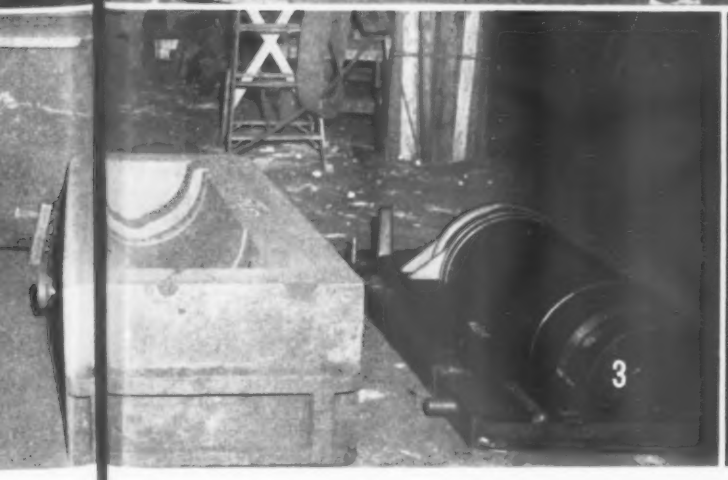


Fig. 3—Cylinder liner castings are molded horizontally, gated at the bottom and poured in a vertical position

Fig. 4 — Piston cores are made in halves and joined with a lead anchor

with a square opening in the bottom close to one end, and a small square core which fits in this opening. The hole in the small square core varies from 1½ to 2¼-in. diameter, depending on the size of the sprue in the cope. Each size is numbered to correspond with a given gate or sprue diameter. The small core is 3½ in. square. The opening in the bottom of the basin core is 4 x 4 in. In making up the runner the small square core is pasted directly over the sprue opening in the cope. The runner basin, 6 x 6 x 15 in., is set on the cope in any one of several positions. The only limiting feature is that the square opening in the bottom of the basin comes over the small square core. When the basin is pressed down the runner is complete. An apprentice using a wood corebox makes the cores on a small jolt machine. The basins are made from a strongly bonded black core sand mixture and are reinforced with two wires bent to shape and placed in the box before it is jolted. After the basin cores are broken to release the iron block, the wires are retrieved and used again repeatedly.

A larger size runner basin has double openings, one near each end, otherwise the details are similar to those in the smaller or single opening type. The double runner basin is employed on molds that require to be poured through two sprues. Sand thickness in the basin cores is 1¼ to 1¾ in. on the sides and 1 in. on the bottom. One laborer sets the runner basins and makes up one or more flowoffs on 75 to 100 molds in ample time to receive the metal on schedule during the regular afternoon pouring period.

Some time ago the design of the pouring basin was refined and improved. While eminently satisfactory in nearly every particular, the original design did not prevent the metal from swirling around the sprue opening. Occasionally this action carried some foreign material down the sprue with the metal. Several experiments culminated in the present design, a series of vertical ribs set close together around the inside wall. With this construction the movement of the metal is perfectly quiet and orderly.

A stopper is placed over each sprue opening before metal is poured into the basin. This is a small cast iron cone about 2 in. diameter at the base, cast around a ¼-in. rod 10 in. in length and terminating in an eye at the upper end. Base and rod are covered with blacking and dried before they are used. In practice the flat face of the base rests on the sand surrounding the sprue opening. After the basin is filled with metal an attendant inserts the end of a rod in the eye and lifts the stopper out of the basin. The device is a cover and not a tapered plug employed in some foundries for the same purpose. While the plug type of stopper is fairly satisfactory, a minor hazard always is present. Unless the edge of the sprue opening is hard and firm, insertion and extraction of the plug may erode the sand to some extent. This broken sand will enter the iron stream and possibly cause a defect in the casting. Application of the runner basin and other details of the gating system for various types of castings are shown in several of the accompanying illustrations. Recognition is taken of the fact that the passage through which the metal runs is an integral and very important

Fig. 5 — Jacketed cylinder head casting requiring an elaborate set of cores is molded and poured in a horizontal position. The hydraulic installation in the cleaning room is particularly effective in removing cores of this character

Fig. 7—Mold and cores for manifold casting. Fig. 8—Pattern, mold and cores for diesel engine base casting. Mold is made in a floor pit

part of any successful molding operation.

Liners for compressor cylinders typified by the 38-in. bore cylinder shown in Fig. 3 are molded vertically from a solid pattern. A long runner extends from the top to a point near the bottom of the mold where the metal enters through a whirl gate. No cope is placed on these molds. A man armed with a light rod watches the iron rising in the mold and by stirring the metal prevents any scum or other foreign material from adhering to the vertical wall of the mold or core. Where any of this material finally reaches the top it enters an extension to the casting which is cut off in the subsequent machining operation.

Some water jacketed manifolds are square, while others are circular in cross section. Fig. 7 shows a mold of the latter type with cores in place, also the jacket and barrel core for another. The mold is made horizontally on a jolt machine, also cored and assembled in the same position. It is upended and poured in a vertical position, thereby eliminating the need for chaplets. The runner extends to the bottom where the metal passes through a dirt catcher and into the mold through a gate in each flange. This thin section casting must be poured with very hot iron. To prevent this iron from burning in, the core is protected by a coating of a proprietary material originally designed for use in steel foundry operation. Since the only outlet for gas from this core is through two ⅝-in. openings at each end of the jacket, the permeability of the core must be exceedingly high. The core is made from a clear sharp or silica sand bonded with oil in the proportion of 1 part oil to 60 parts sand. Venting is amplified and accelerated by strands of vent wax incorporated in strategic areas while the core is under construction. On account of the shape, also the minimum green sand strength, the half cores are supported on a mound of black sand while en route to, and while in the oven.

Pattern and mold shown in Fig. 8 are for a 1000-hp, 8-cylinder diesel engine base weighing 21,600 lb, cast entirely in cores assembled in one of the casting pits. Cores shown on the truck are part of the set of cover cores placed on top of the mold. Cores are wedged under the flat bars of a cope which then is rammed full of sand. Suitable weights are placed on the cope, and a number of binder bars overhanging the cope at both sides are held down by anchor bolts attached to binder bars under the mold. Contrary to fairly common practice of molding the casting with the oil pipe in the bottom, these bases are cast with the oil line above. Collars welded on the pipe at each bearing are 1/16-in. thick and the assembly must be oil tight at the junction where the drilled hole from the bearing enters the pipe. The collars must fuse to the casting to prevent oil leakage from the crankcase.

Before the pipe is placed in the mold it is pressure blasted to remove all rust or scale from the surface, one of the most essential features in securing perfect fusion union with the casting. In early experimental work, the pipe was filled with fine, new lake sand. This material melted and fused inside the pipe and involved a great deal of difficulty in removal. In an improved technique discovered later, the pipe is filled with fine spent sand from under the tumbling barrels. This inert material, having been once in contact with molten iron, apparently is immune to any further high temperature. The ends of the pipe are plugged with core sand and dried. A vent is taken off at each end. In the cleaning room the sand readily is removed from the pipe.

Core setting for this and other large castings is facilitated by a 2000-lb capacity air hoist of the type manufactured in the company's (*Please turn to page* 184)

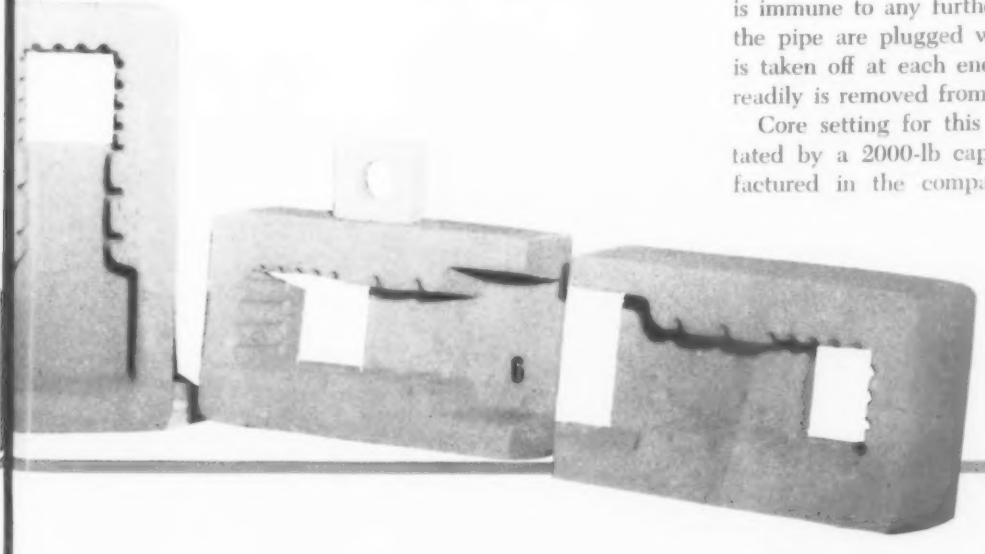
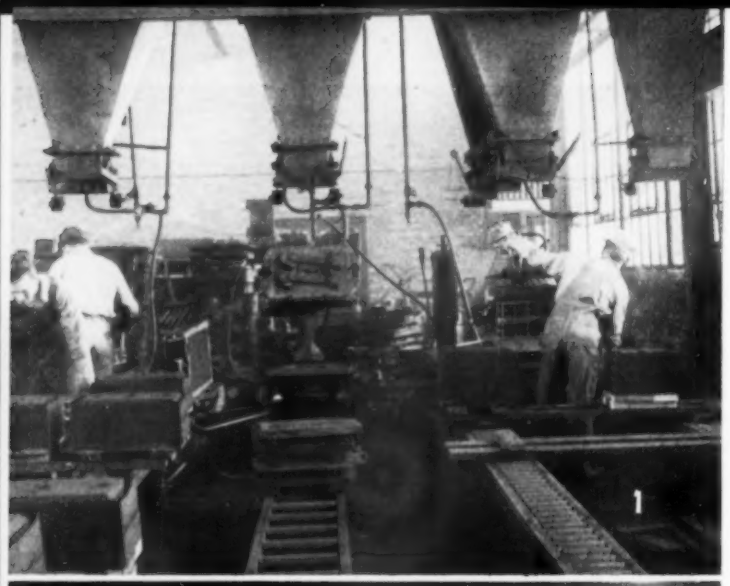
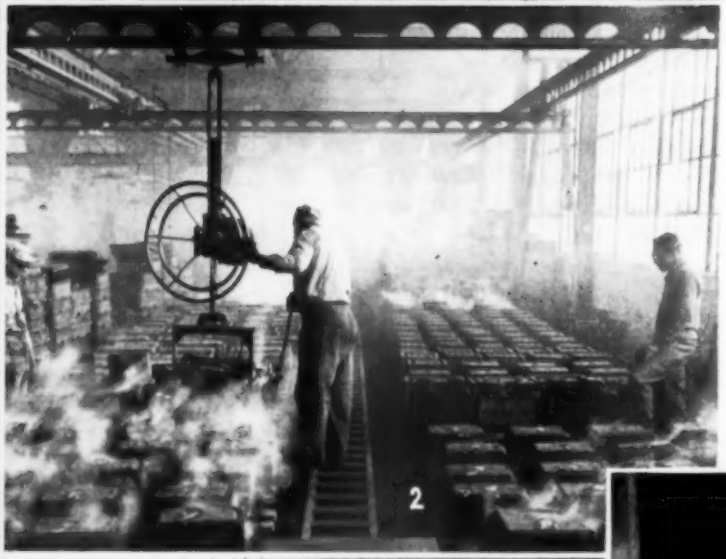


Fig. 6—Ribs on the interior eliminate turbulence in single and double runner basins





McNALLY PITTSBURG FOUNDRIES INC., Pittsburg, Kans., recently erected and equipped a modern mechanized gray iron foundry for a daily production of 25 tons of castings ranging in weight from small snap flask items to parts weighing approximately 3 tons. A heavy tonnage of castings, plain gray iron and special alloy iron designed to meet definite specifications, is processed and assembled in the machine shops of the parent corporation, McNally Pittsburg Mfg. Corp., which specializes in the construction of coal mining machinery and complete coal preparation plants. A considerable tonnage of castings also is sold on a commercial basis.

For the benefit of the average reader whose geographical knowledge is not quite up to that of the omniscient quiz program experts, it is interesting to note that the name "Pittsburg"—in some instances "Pittsburgh"—is claimed by cities, towns and small communities in ten states: California, Georgia, Illinois, Kansas, Kentucky, Massachusetts, New Hampshire, Oklahoma, Pennsylvania and Texas. Doubting Thomases—the tribe never dies out—may check the foregoing statement in no less an infallible authority than the United States Postal Guide.

Assuming that this point now is settled, it may be per-

Fig. 1—Jolt squeeze department of McNally Pittsburgh Foundries operates four machines on snap flask molds. Molds are placed on bridges and rolled toward pouring end

Fig. 2—Pouring is continuous on the snap floor. Poured molds are dumped onto a scraper conveyor which delivers them to the shakeout. Mold boards and bridges are returned on a roller conveyor

Fig. 3—Pouring medium size molds on a roller conveyor. These molds are made on jolt rollover and jolt strip machines

Fig. 4—Checking the iron temperature at the cupola spout. All metal is handled through a mixing ladle

Fig. 5—Main bay of the three-bay foundry. Sandslinger at left rams largest molds in this bay

tinent to point out that the Pittsburg—without the final *h*—in the present discussion is a lively progressive city in the southeast corner of Kansas, close to the Kansas-Missouri border line and 125 miles due south from Kansas City. Connection with the remainder of the country is maintained through four railroad lines; Atchison, Topeka & Santa Fe; Kansas City Southern; Missouri Pacific, and St. Louis & San Francisco.

Practically every feature designed and developed in recent years for efficient and economical foundry operation, for the elimination of manual labor and for favorable hygienic conditions has been incorporated in the new plant. Molders do not either shovel or ram the sand. The sand is prepared and distributed by mechanical equipment and is rammed by various types of molding machines, depending on the size, shape and other characteristics of the patterns. Molds are made on plain squeezers, jolt-squeeze-strip, rollover-pattern draw, heavy jolt rollover and a locomotive type sandslinger which travels on a track extending the full length of the main bay. A tile lined room provided with shower baths and clothes lockers contributes to the comfort and convenience of the employees.

The steel frame building 111 x 214 ft and 29 ft high, with brick walls, full-length windows and gypsum slab roof—is amply lighted and ventilated naturally and artificially. Natural lighting is amplified when necessary by high intensity lighting on all floors. A suction ventilating system with intakes at all strategic points removes dust, steam and smoke and maintains a clean atmosphere throughout the shop at all times.

Large molds made under the sandslinger in one bay, are set up for pouring on the floor. Snap flask molds made on a battery of four squeezer machines at one end of the third bay, and medium size molds made on jolt rollover and jolt strip machines in the center bay are placed on roller conveyor lines. Members of each twin conveyor line on the snap flask floor are about 6 ft apart and the molds are placed on wooden planks or bridges which ride on the rollers under each end. Medium weight molds ride on single conveyor. Accordingly as the molds in each batch are poured they are moved along toward the shakeout, and to make room for others. Molds are shaken out over the end and the empty flasks and bottom boards are returned to the various molding stations on a roller conveyor line.

Synthetic sand for molds and cores is prepared in a muller type machine centrally located and connected to a belt conveyor for delivering (*Please turn to page* 232)

Kansas Manufacturer Builds

Modern Gray Iron Foundry

4

5

Questions and Answers

Chill Test Use in the Foundry

Q.—We are having considerable trouble in determining the effectiveness of chills on certain small gray iron castings. Do you know of any *gadget* which may be used for determining the uniformity and depth of chill on these castings?

A.—If by a gadget you mean a device or instrument for determining—presumably in advance—the uniformity and depth of chill on your castings, we regret that up to the present no inventor has developed anything of the kind. The widely practiced method is to use the chill test in which a sample or iron from the ladle is poured into a small open top mold, sand on three sides and an iron plate or block on the fourth side or, in some instances, on the bottom. When the test piece is broken, the observer notes the character of the fracture, and the depth of chill. He draws the necessary conclusion and makes the necessary corrections in the composition of the metal in the ladle. However, this is a form of knowledge acquired only through long practical experience. There is no short or royal road. The observer needs a keen eye, a long memory and a fair background of metallurgical knowledge. A form of quick, practical test for the guidance of the foundry foreman or superintendent was described and illustrated in the November, 1935, issue of THE FOUNDRY.

Gives Data on Cupola Tuyeres

Q.—We desire to operate a cupola of 48-in. shell diameter lined to about 36 in. for melting cast iron scrap. Iron should be hot enough to run small thin castings, since most of our work is snap flask operation. Can you give us information on proper construction of the air chamber as well as location, size and number of tuyeres needed? Our blower is capable of delivering 3600 cu ft of air at 16 oz pressure.

A.—A cupola lined to 36 in. should melt about 5 tons per hr. An iron-to-coke ratio of 8 to 1 should supply good hot iron, and the suggested charges of iron and coke are 680 lb and 85 lb, respectively. Tuyere area should be between one-fifth to one-sixth of the cross-sectional area of the cupola or 180 sq in. Using six tuyeres each will have a cross-sectional area of 30 sq in. which can be resolved into dimensions of 4 in. high and 7.5 in. wide at the shell. If desired, the opening at the lining can be flared in the horizontal plane to 10 in. or more. Melting at the rate of 5 tons per hr with an 8 to 1 iron to coke ratio, the blower should supply about 2750 cu ft of air per minute.

According to available information the windbox or air chamber varies with the diameter of the cupola and ranges from 10 to 14 in. wide and 3 to 4 ft in height. Hurst mentions that the windbox should hold at least one second's supply of air which in this case in round figures would be 50 cu ft. Hence, an air chamber 14 in. wide and 3 ft high will serve, or one 12 in. wide and 3½ ft high. Windbox should have cleanout doors on each side midway between taphole and slaghole so that it can be cleaned out from time to time since occasionally slag will overflow through the tuyeres into the windbox.

Casting Contains Many Holes

Q.—We are sending for your examination two sections of gray iron castings with which we are having trouble. You will note that both contain numerous holes just under the skin, and revealed upon a machining cut.

A.—The castings submitted for study are as full of holes as the well known Swiss cheese which, as you mention, appear just under the skin. The holes have bright interiors rather than being dull and discolored which to us in combination with their location indicates that they are caused by gas contained in the metal rather than from steam, etc. evolved at the mold face. We can only guess as to how the gas entered the metal, and the following come to mind: Cupola spout not dried out thoroughly, or a ladle lining in the same condition. The boiling action resulting from the contact of molten metal with the moist refractory drives gas into the metal. It does not have time to escape before the skin is formed on the casting, and comes to rest under it. Another possibility is melting with a low bed.

Melting Rate Unsatisfactory

Q.—Our cupola seems to be melting slower than it should. It is lined to 32 in., and operates best with a 3-in. belly at the melting zone or 38 in. diameter at that point. Blower is an old No. 6 Buffalo running at 3200 rpm and driven with a 15 hp motor. Cupola has four tuyeres 4 x 5 in. located 8 in. above sand bottom. Bed extends 24 in. above tuyeres, and we are using a 600-lb iron charge with 75 lb coke, and 15 lb limestone beginning at third charge. We are melting about 3 tons per hr, but with past experience in another cupola we should get about 5 tons per hr. We are using enough coke to get good hot iron, but after running about 2 tons, the cupola slows up and gives indications of bridging above the tuyeres.

A.—Usual method of determining the melting rate of a cupola is to assume that 10 lb of iron are melted per sq in. of the area per hr, and since a 32-in. cupola contains 804 sq in., the melting rate should be about 4 tons. When that method is used, the assumption is that the coke-to-iron ratio is 1 to 10. Hence, with a 1 to 8 ratio which you employ, the melting rate would be reduced to say around 3¼ tons per hr. However, the method is not an exact one, since it is not unusual for a 32-in. cupola to melt 5 tons per hour.

You mention a No. 6 blower running at 3200 rpm using a 15 hp motor. A manufacturer's catalog indicates that at that speed the blower produces 1100 cu ft of air per minute. However, the outlet diameter is given as 6½ in., and the hp required as under 4. If the blower is supplying only the amount of air indicated, it is too small,

since melting 3 tons per hr with an 8-to-1 ratio the amount of air should be about 1650 cu ft per minute. Highest rating given for the particular blower is 1510 cu ft per minute at 4380 rpm.

It appears to us that your coke bed is low, and that may account for the slowing down in melting (and presumably cold iron). We believe that it should be at least 36 in. above the tuyeres. One way of determining the least height above the tuyeres to which the bed should extend is to observe where the bottom of the melting zone lies. The bed coke should extend up to that point in any case, and preferably about 6 in. above to provide sufficient coke to melt the first iron charge.

You probably could increase the melting rate as previously indicated by reducing the coke-to-iron ratio. In that case there would be a reduction in molten iron temperature which might cause trouble if light section castings are being made.

Making Aluminum Matchplates

Q.—We are interested in making pressure-cast matchplates. Do you have any information as to the equipment required for this work? We would appreciate any literature on the subject.

A.—Main essential in the production of pressure-cast matchplates is the skill and knowledge gained by experience in that type of work. As far as the mechanical equipment is concerned you need plaster or gypsum composition compounded particularly for making castings, and which can be secured from a number of sources. In addition you will need equipment for mixing the plaster composition with water to develop the proper consistency, plate glass topped tables for arranging and combining the piece molds to form one mold, large flasks for that work, and smaller adjustable flasks for making piece molds, smooth, drying ovens, metal topped tables for pouring, clamps etc.

Articles which relate to the process include "Pressure Casting Aluminum Matchplates" by J. P. Callahan, published in the July, 1945, issue and "Pressure Casting Matchplates" by Edwin Bremer in April, 1947, issue of THE FOUNDRY.

Pattern Care and Maintenance

Q.—We are interested in learning all we can regarding the care and maintenance of wood patterns and will appreciate any information you can supply.

A.—Care and maintenance of wood patterns covers a broad field since it would include the variety of patterns used, the different woods which are employed, and the wear and abuse to which they necessarily are subjected. Patterns usually are made from choice, well-seasoned wood in a comfortably heated shop with relatively low humidity. Then they are used in a foundry with a much higher humidity, covered with damp sand in use, and handled without too much care. Since only a limited amount of space is at our disposal for discussions, we can only touch briefly on a few main points in pattern care.

Since the pattern is used to make the sand mold it receives considerable abrasion during ramming and drawing operations which eventually wears through the pattern coating. Hence, the pattern should be recoated with shellac or other suitable material from time to time to prolong its life. Once dampness attacks the bare wood stresses are set up which tend to warp, twist and swell the pattern. Patterns soon show the effect of careless rapping and drawing. Holes from rapping and draw spikes are made in several places or in one spot, and those eventually lead to splitting of the pattern. Prevention of that requires installation of rapping plates.

Use of wood dowels instead of metal in a split or parted pattern is false economy where more than a few castings are required. Wood dowels absorb moisture, swell and defeat the purpose of a split pattern—that of easy parting—since the pattern halves stick together. Dowels which stick should only be sanded down by someone familiar with their use, or they should be replaced. A molder left to his own devices soon files them down to where a sloppy fit results in a casting showing a definite shift which might be attributed to a mold shift or poor molding.

Loose wood screws resulting from rusting of the threads should be replaced. Loose pieces having dowels should only be lightly sanded in event that they stick. Metal rods or spikes can be used in place of wood dowels. Coreprints which are loose-seated are often located by a central dowel pin. While that is an ideal means for true location, the molder quite often uses the female seat as a rapping hole or place for a draw spike which soon results in a loose coreprint and out-of-round hole. Put in two separate dowels to correct that rather than to repair.

Loose fillets should be fastened by a suitable adhesive, and the ends should be nailed to prevent repetition. Bruised corners should be repaired, as should other damaged pattern surfaces. Unless that is done, costly mold patching results with unsightly castings. Many of those defects can be traced to cheap, first-cost of a pattern.

GANGWAY! By J. A. PATTERSON

"Don't stand there and try to tell me you didn't know it was turned on, Wiseheimer!"

Last, but not least, the foundry superintendent should insist on careful wiping of the pattern at the end of the day's use to free it from any adhering sand which might harden and cause defective castings. Also he should request that any of the points mentioned previously be brought to his attention so that the pattern may be repaired before damage reaches a more costly stage.

Production of Master Pattern

Q.—We will appreciate information on the process of making master patterns of plaster of paris, or of any other economical method of making master patterns for book ends, small animals, etc. The patterns will be used in snap flasks on jolt-squeeze molding machines.

A.—A number of materials are available for the purpose of making patterns in addition to plaster composition which you mention, and include proprietary pattern compounds and castable resins. Mold for making the duplicate patterns is preferably made of plaster composition since it can be used over and over again by application of a suitable parting compound. The duplicate patterns can be mounted on a board to form a gate of patterns, or they may be bedded in fine sand, plaster composition, etc., a metal frame placed around them, and the same type of material poured around them to form a matchplate. A number of articles have been published on the subject and include "Patterns of Gypsum Cement" in the October and November 1944, issues of THE FOUNDRY; "Matchplate Patterns From Phenolic Casting Resin" by C. R. Simmons, November 1946 issue of THE FOUNDRY, and "Describes Improved Methods in Making Matchplates of Plaster Composition" by C. C. Brisbois, *Transactions*, American Foundrymen's Association, 1945.

Castings Not Pressure Tight

Q.—We are just starting production in a small brass foundry making plumbing fittings and are having difficulty in obtaining pressure-tight castings that are free from sand holes and other surface defects. Can you give us the names of some textbooks relating to brass foundry practices which would be helpful? Incidentally, we tried the use of the potassium nitrate flux mentioned in the November issue, but could not notice any improvement in results. We are melting pig brass in gas-fired tilting furnaces and making the castings in sand molds.

A.—Difficulty due to lack of pressure tightness of your castings may arise from two main causes—gas absorption during melting, and lack of proper feeding. The former seems to cause more trouble, and possibly may be the reason why your castings are not sound. You mention that you tried potassium nitrate—copper oxide flux without results, but that is not strange since presence of over 2.5 per cent zinc or phosphorus causes difficulty in that they function as deoxidizing agents, uniting with the oxygen supplied by the flux. In the case of small amounts of phosphorus, they are removed by the fluxing or oxidizing reaction as is the hydrogen. However, in the case of larger amounts of phosphorus and zinc above that mentioned, degassing is best accomplished by flushing by violent bubbling with dry nitrogen or by placing 2 per cent by weight of the charge of manganese ore in the bottom of the charge.

While those methods degas the metal, it takes time and money to do the work, and the less gas to be removed the shorter the time and the lower the cost. Hence, it is advisable to melt so that gas absorption is held to a minimum. Consequently, the melting should be accomplished as rapidly as possible to reduce the period in which gas absorption can take place. Furnace atmosphere should be slightly oxidizing by adjusting the burners to provide a short sharp flame as opposed to a longer yellow or yellowish tinged flame. After the molten metal has reached the desired temperature, it should be removed from the furnace—not allowed to stew at high temperature. Metal should not be heated to temperatures any higher than necessary, since the higher the temperature, the greater the gas pick-up. Ideal temperature in the furnace is that which permits skimming and handling to the mold side where the metal arrives at the proper pouring temperature. Pouring temperatures of the leaded red and semi-red brasses range from 1950 to 2250 F.

Sand holes and other surface defects may arise from a variety of causes. The former may be due to the molding sand not possessing the proper characteristics such as bonding properties, moisture content, etc. Other possibilities include not blowing out the mold, and allowance of too much crush at the mold joint.

Sand Wears Well in Aluminum

Q.—Is there a set rule or time limit on how long Albany molding sand should be used? Is there any definite rate at which new sand should be added to compensate for the daily loss? We make a miscellaneous line of aluminum castings. The sand heaps are wet down and cut over three or four times every day. New sand is added occasionally, but the same sand heaps have been used steadily for about 1½ years. Should we get rid of all the present sand, or should we get rid of a certain amount and build up the heaps with new sand?

A.—Since you do not state in what manner the old sand is not functioning satisfactorily, we are at a loss to understand why you wish to get rid of it and replace the heaps with new sand. Replying to your specific questions, there is no rule or limit on how long Albany—or other—sand should be used. In steel and iron foundries where the sand comes into contact with molten metal at exceedingly high temperature, a certain amount of the clay is burned out and a certain amount of the sand grains are cracked and converted into fines. Another portion clings to the castings and is discarded in the cleaning room.

Compensation for this loss is supplied by the facing sand placed in the molds every day, and by an amount of new sand added to the heaps or introduced into the mechanical distribution system. The actual amount required to keep the volume of sand up to standard is determined by experience. A steel foundry consumes more new sand than an iron or brass and bronze foundry. A foundry engaged in the production of heavy castings needs more new sand over a given period than a shop engaged in the production of light castings. Aluminum is poured at a comparatively low temperature, 1250 to 1350 F, therefore the sand is not burned and the sand grains are not destroyed. With a small sprinkle of new sand occasionally, to compensate for the trifling amount which clings to the castings, the sand in the heaps should function satisfactorily for an indefinite period. In many instances the same sand heaps, with minor additions of new sand, have been in constant use since the shops were built years and years ago.

HOW YORK CORPORATION CUTS CASTING REJECTS

YORK CASTS THOUSANDS OF PARTS LIKE THESE IN NICKEL CAST IRON
Famous for refrigeration and air conditioning, York has installed a greater aggregate capacity of mechanical cooling for commercial use than any other manufacturer. York not only insures their high reputation by use of long-wearing Nickel cast iron parts, like those shown here, but also gains production economies through the superior machining qualities of Nickel cast iron.

A foundry producing as many castings as York Corporation can't afford a high percentage of rejects . . .

That's why York uses Nickel to keep quality up, costs down, and to minimize rejects in both the foundry and machine shop.

After testing cast irons of all types, York's engineers virtually standardized on Nickel cast iron because it provides consistently strong, fine-grained castings, free from porosity and brittleness, and readily machinable in the shop.

York's experience is typical of hundreds of other foundries now using Nickel cast iron to secure these basic advantages:

IN THE FOUNDRY –
By minimizing rejects, Nickel raises man-hour output and correspondingly cuts down the time, labor and money lost by replacing such rejections.

IN THE MACHINE SHOP –
Nickel cast iron also cuts rejects here, because the improved structure and uniformity of the metal provides sound castings that can be easily machined to a smooth finish.

IN SERVICE LIFE –
Nickel cast iron parts provide exceptional wear-resistance that assures long, trouble-free performance for the ultimate consumer.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

The Young Man and the FOUNDRY INDUSTRY

By A. W. GREGG
Executive Engineer
Whiting Corp., Harvey, Ill.

WE ARE constantly being told that the young men in our high schools, colleges and technical schools are not being attracted to the foundry industry, and this serious situation is now receiving critical and preferred attention by foundry executives and various foundry associations.

Does the trouble lie with our young men, or with the foundry industry itself? It seems to be the general opinion that young Americans are not willing to work, that they are looking for the white collar jobs and are not interested in any job where they will get their hands dirty.

Anyone who has taken the trouble to contact these young men in their schools and colleges knows that this is just a lot of bosh and nonsense. Watch them at their sports some rainy Saturday afternoon and see if they are afraid of getting dirty. Talk to them in their clubs and fraternity houses. Look at their records in the late war. If it is possible to get them to talk, you will be surprised to find what an earnest and intelligent lot of young men we have in our schools today. We know they can be interested in jobs where they can express themselves, where they will receive recognition, and where effort will be rewarded. They certainly will not shrink from a job because it entails hard work.

Where can these young men find opportunities for advancement and an interesting life job to compare with the foundry industry? We believe they are not being attracted to the foundry because they have not been shown the fine opportunities which it offers to the technically trained graduate, and the romance and interest of the business. They have not been told of its great history and tradition, nor has its vital place in industry and civilization been properly emphasized.

No, the trouble definitely is not with our young men—it is due to a poor job of selling by the industry itself, and the foundries have only themselves to blame. The lack or entire absence of definite training programs has also been a factor.

Competing industries have done a better job of attracting the technical men. For example, the welding industry has maintained experts at the technical schools to tell the boys that castings are obsolete and that weldments will ultimately replace them. They do not stop with the students—faculty members are being subjected to the same kind of propaganda.

The layman's idea of the foundry is usually based on the old-time foundry which is so rapidly disappearing. Mechanization of all foundry operations today is taking the manual effort out of the business and changing the manufacture of castings from an art to a science. This trend presents problems for mechanical, electrical and metallurgical engineers second to no other industry. The engineer's contribution to our recently built foundries represents the all-important difference from the foundries of our fathers and grandfathers.

The operation of a modern, well equipped foundry is largely a problem of mechanical handling and moving of materials. How many people realize that foundries must handle something like 75 to 125 tons of material for every ton of good castings shipped?

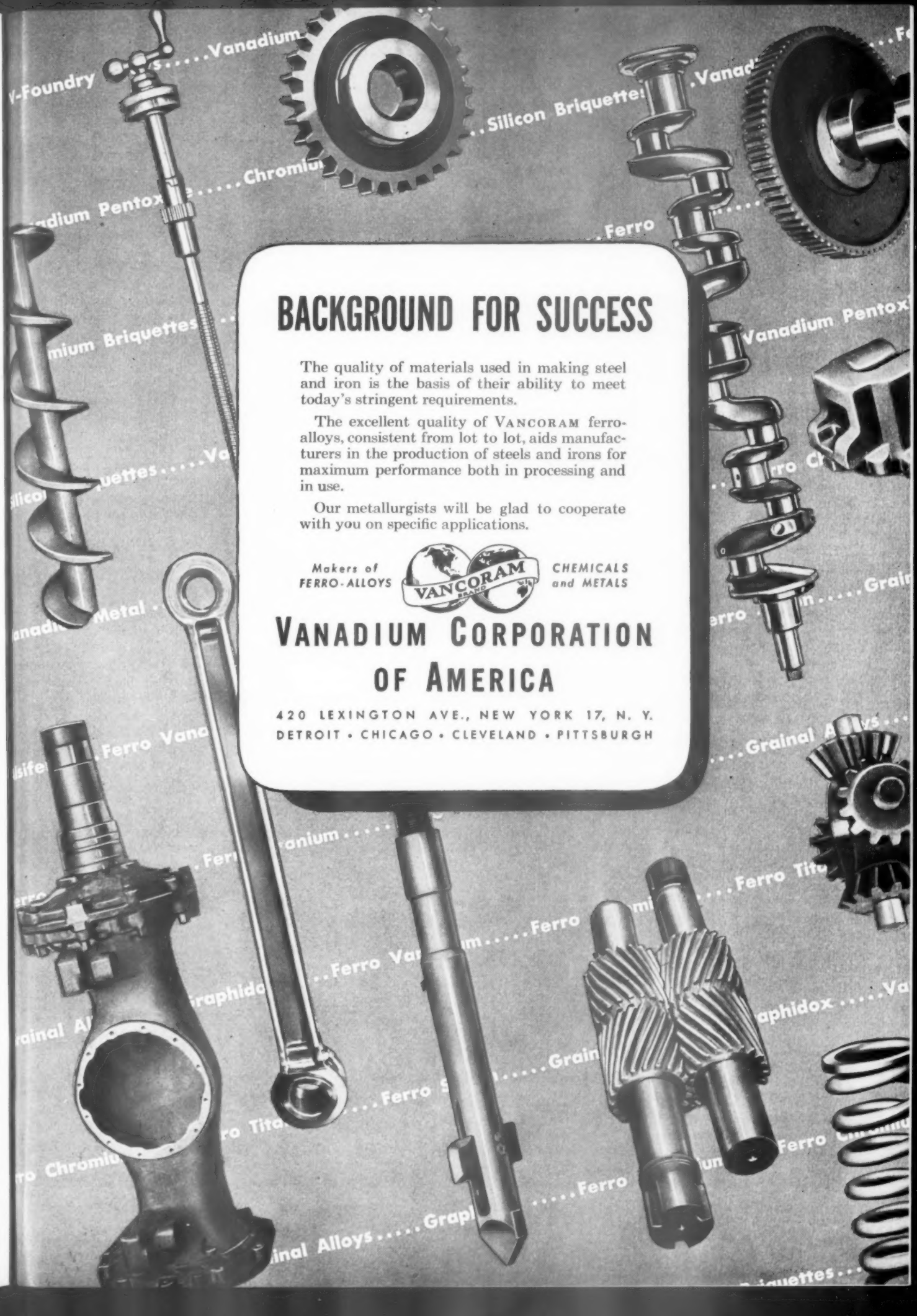
The shovel and the wheelbarrow are very rapidly becoming obsolete foundry tools. Today, molding machines, conveying equipment, sand preparing and distributing systems, shakeout equipment and mechanized charging equipment have taken the hard, manual labor out of the foundry, and our newer foundries have floors and good lighting, heating and ventilating systems. This equipment, for which the foundry engineer must be given credit, has made the foundry a good place to work, but best of all, these improvements are a challenge to the engineer to do an even better job. Probably there is no operation in any foundry which cannot be improved, and there is a crying need for young men of good education and a willingness to work and carry on.

Presents Opportunities for Young Engineers

We can think of no industry which has more interesting problems awaiting solution by the young mechanical and electrical engineering graduates, and the opportunities for the metallurgical graduate are just as numerous and fascinating.

Without the foundry metallurgist World War II could not have been won. Engineering handbooks and specifications are having a difficult time to keep up with the metallurgist. Only a few years ago anyone talking about cast iron with 60,000 lb (and over) tensile strength would have been consigned to an asylum. The use of alloys in both iron and steel foundries presents many important and interesting possibilities for improvement, and heat treatment is a field which has been hardly scratched.

As an old timer who went from college into the foundry business, we would like to offer a few words of advice to the young high school or college graduate who is contemplating a foundry career. Don't go to work in a foundry if you are afraid to work. To go a step farther, we recommend that you do not go into *any* line of business, if you are afraid to work. Go on relief. But, if you are looking for a job where there is a lot of room for intelligence and initiative, there is no better opportunity than can be found in the foundry business. There is no place where you will find (*Please turn to page* 232)


Vanadium
Silicon Briquettes
Ferro
Vanadium Pentoxide
Ferro Vanadium
Ferro Titanium
Ferro Chromium
Grainal Alloys
Graphidox
BACKGROUND FOR SUCCESS
The quality of materials used in making steel and iron is the basis of their ability to meet today's stringent requirements.
The excellent quality of VANCORAM ferro-alloys, consistent from lot to lot, aids manufacturers in the production of steels and irons for maximum performance both in processing and in use.
Our metallurgists will be glad to cooperate with you on specific applications.
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MEN of Industry

FRED B. SKEATES, recently elected president of the Chicago Chapter, American Foundrymen's Association for 1947-48, is foundry superintendent of the Link-Belt Co. in Chicago. Mr. Skeates entered the Pershing Road plant of the company there, in 1903, as office boy in charge of mail deliveries. He was transferred to the cost accounting department 2 years later and in 1909 was promoted to the production department where he worked in all phases of plant production and later was transferred to the shop planning board. In 1917 he became foundry clerk and completed his foundry apprentice training course in 1926. He was appointed foreman in 1927, assistant superintendent in 1930 and has been superintendent since 1935, with the exception of one year of active service as colonel in the Army. Upon release from federal service in 1942, he returned to Link-Belt. An active member of the AFA, he served as vice president of the Chicago Chapter last year. He is also a member of ASM and ASTM.

♦ ♦ ♦

Wayne Z. Friend has been appointed assistant section head of the corrosion engineering section, Development and Research Division, the International Nickel Co. Inc., New York. A graduate of West Virginia University, Mr. Friend was associated with the Development and Research Department of the Baltimore Gas Engineering Corp., Charleston, W. Va., until 1929, when he successively became district manager and chief technologist of the Philgas Department, Phillips Petroleum Co., in Boston and Detroit. He has been with the Development and Research Division of International Nickel in New York since 1937.

♦ ♦ ♦

George M. Lund has been elected president, Despatch Oven Co., Minneapolis, succeeding the late **H. L. Grapp.** Mr. Lund has served for many years as comptroller, vice president and assistant to the president. **C. P. Doherty,** formerly factory manager, has been named executive vice president and general manager. Other officers and directors appointed include **G. L. Schuster,** vice president-treasurer and chief engineer; **Fred Larson,** vice president-secretary and chief electrical engineer; **Mrs. Ida S. Grapp,** director; **John W. Watson,** vice president in charge of the Chicago branch of the company. **A. E. Grapp,** company founder, continues as chairman of the board of directors.

♦ ♦ ♦

Paul J. Maddox, assistant vice president of the Laclede-Christy Clay Products Co., St. Louis, has been appointed general sales manager of the refractories division in charge of sales of suspended arch and supported walls, high temperature cements and mortars, and all grades of fire brick. Mr Maddox joined the company in 1932 as a direct salesman. Since then he has acted in various capacities for the sales department, principally heading dealer and agent sales, high temperature specialties and the arch and wall division.

♦ ♦ ♦

Ken O. Hood, until recently manager of the Cincinnati district, Falk Corp., Milwaukee, has been appointed Pacific Coast district manager, with headquarters in Los Angeles. Mr. Hood, who has been associated with the company for more than 10 years, spent 7 years on the sales staff in Detroit. **Kenneth W. Morrissey** has returned to the Cincinnati district as manager, following an absence of 4 years which he spent at the home office on special assignment during the war. Mr. Morrissey joined the company in 1928 and served in the Los Angeles and Pittsburgh sales districts before becoming Cincinnati district manager.

♦ ♦ ♦

Guy C. Beishline, district manager of the American Car & Foundry Co., Berwick, Pa., has retired because of poor health. Mr. Beishline began his career at the Berwick plant but left the company in 1914 to became associated with the Mount Vernon Car Mfg. Co., Mount Vernon, Ill., where he became superintendent. He returned to American Car & Foundry Co. in 1937.

♦ ♦ ♦

E. P. Fenton has been named president, the Fenton Foundry Supply Co., Dayton, O., succeeding the late **William Fenton. J. L. Thies** will continue as secretary and general manager, **Charles E. Whiton** as vice president, and **Fred J. Vlaskamp** as sales manager.

♦ ♦ ♦

A. H. Jones, for many years manager of the Los Angeles office of the Gardner-Denver Co., Quincy, Ill., has been appointed director of its export office in New York. Mr. Jones has also been

(*Continued on page* 102)

FRED B. SKEATES

WAYNE Z. FRIEND

GEORGE M. LUND

C. P. DOHERTY

UNIFORM WOODWARD IRON . . .

A Combination of Equipment and "Know-how"

Over a period of many years—not excepting the trying years of wartime—Woodward has jealously maintained its reputation for producing iron to meet the most exacting specifications. This quality of uniformity is not a happy accident. It is a combination of the best equipment and experienced "know-how."

Among the many factors that contribute importantly to uniformity of Woodward iron are: a uniform base ore burden from the same ore body; furnace air conditioning to duplicate the most favorable atmospheric conditions; use of 65-ton capacity ladles designed for complete uniform mixing of one full carload of pig iron; rigid laboratory controls and checks and the long experience of practical iron makers, familiar with methods that get best results.

No matter what type castings your foundry is producing, you can look to Woodward for a dependable source of uniform supply.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

GENERAL SALES OFFICES: 1515 First National Building • Birmingham, Alabama • Phone 4-6786

(*Continued from page* 100)
elected vice president of the newly formed Gardner-Denver Western Hemisphere Co., with headquarters in New York.

♦ ♦ ♦

J. S. Zabel and **D. M. Gerlinger** have been appointed to the sales staff of Gerlinger Equipment Inc., Milwaukee, recently organized to take over the equipment division of Engineering Service Inc., Milwaukee. The company will handle sales of foundry and general industrial equipment in Wisconsin for the Beardsley & Piper Co., Chicago; Claude B. Schneible Co., Detroit; SPO Inc., Cleveland; Logan Engineering Co., Chicago; Young Brothers Co., Detroit; Redford Iron & Equipment Co., Detroit; Lyon-Raymond Corp., Greene, N. Y.; Centrifugal Machine & Engineering Co., Kalamazoo, Mich.; Barber-Greene Co., Aurora, Ill.; and Stroman Furnace & Engineering Co., Franklin Park, Ill. Mr. Zabel, a graduate of Baker College, was associated with Fairbanks, Morse & Co., Beloit, Wis., prior to 3 years of Navy service from which he was recently released. Mr. Gerlinger, was graduated from University of Wisconsin, and was associated with Milwaukee Ordnance Works prior to a year of military service from which he was released to do research work on jet propulsion engines at Alloy Castings Co., Champaign, Ill. He has been with Engineering Service Inc. for the last 6 months. **Walter Gerlinger** is president of Gerlinger Equipment Inc.

♦ ♦ ♦

John H. Matthews has been elected vice president in charge of the Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J. Mr. Matthews was graduated from Stevens Institute of Technology and joined the Manhattan Rubber Division in 1914 as a machine shop draftsman. In 1940 he was made assistant factory manager and in 1942 became assistant general manager of the Manhattan Division.

Magnus Neshiem, superintendent of the iron foundry, Ludlow Valve Mfg. Co. Inc., Troy, N. Y., has been granted leave of absence to visit Norway, where he entered the foundry industry, and where he will study conditions, methods and foundry problems. Mr. Neshiem began his apprenticeship there and continued it at the Phoenix Mfg. Co., Eau Claire, Wis., where he became foreman and superintendent. Later he joined the Western Iron & Foundry Co., Wichita, Kans., as foundry superintendent. In 1936 he was appointed superintendent of the iron foundry at Ludlow Valve Mfg. Co. Inc. **Francis I. Virgamini** has been appointed foundry superintendent during Mr. Neshiem's leave. Until recently Mr. Virgamini was associated with Gould Pumps Inc., Seneca Falls, N. Y.

♦ ♦ ♦

L. D. Blickenstaff has been appointed pattern shop superintendent, Flint & Walling Mfg. Co. Inc., Kendallville, Ind. Until recently, Mr. Blickenstaff was associated with the Process Pattern & Engineering Co., Fort Wayne, Ind. **Boyd Freed** has been made coreroom superintendent at Flint & Walling, succeeding **Jacob Ault.**

♦ ♦ ♦

George Myers, formerly factory superintendent, has been appointed assistant plant manager, the Perfect Circle Corp., Hagerstown, Ind. Mr. Myers has been associated with the company since 1944.

♦ ♦ ♦

William J. Grede, president, Grede Foundries Inc., Milwaukee, has been elected a Class B director of the Federal Reserve Bank of Chicago.

♦ ♦ ♦

Herbert B. Plunkett has been appointed director of sales in charge of domestic and export operations, A. P. Green Fire Brick Co., Mexico, Mo. Other appointments occurring as a result of reorganization of management control include: **Arthur D. Bond,** director of affiliate and subsidiary companies, domestic and foreign; **Lester J. Miller,** director of manufacturing; **Neal S. Wood,** director of procurement and properties; **D. H. Kreutzer,** director of finance; and **Walter G. Staley,** director of industrial relations. All of the appointees have been made vice presidents and members of the board of directors.

♦ ♦ ♦

Robert J. Wilson has been appointed general factory superintendent, and **Robert G. Griffin,** superintendent of the enamel department, Renown Stove Co., Owosso, Mich. Mr. Wilson, who until recently operated his own machine shop, was formerly associated with General Motors Corp., Detroit, Thorez & Maes, and Aeroquip, both of Jackson, Mich. Mr. Griffin, prior to joining Renown, has had 12 years of experience with Kalamazoo Stove & Furnace Co., Kalamazoo, Mich., and Round Oak Corp., Dowagiac, Mich., in porcelain enamel work.

♦ ♦ ♦

Elio DeCapite, for 4 years associated with City Pattern Foundry & Machine Co., Detroit, as foundry metallurgist, has been appointed superintendent of the foundry division. Following his graduation from the University of Detroit, he was employed by Kelsey-Hayes Wheel Co., and later Bohn Aluminum & Brass Corp., Detroit, after which he assumed direction of the metallurgical laboratory at City Pattern.

♦ ♦ ♦

Herman Van Fleet Jr. has been appointed New England district manager, Air Reduction Sales Co., New York, and in addition will be in charge of plants at Boston, South Portland, Me., and Central Falls, R. I., with headquarters in Boston. Mr. Van Fleet, a graduate of Cornell University, joined the company in 1937, served as salesman in Baltimore and St. Louis, and following 4 years of army service was appointed assistant to the manager of the Metropolitan New York district. **L. A. Hamilton,** formerly

(*Concluded on page* 106)

J. S. ZABEL

D. M. GERLINGER

J. H. MATTHEWS

MAGNUS NESHIEM

EF

GAS FIRED,
OIL FIRED
and ELECTRIC FURNACES

. . . . . feature many exclusive advantages

● EF furnaces will give you the utmost in efficiency and economy, and reflect the advantage of many service-proved features—conceived and perfected by EF engineers—and available only in EF design. These include the EF radiant tube and EF heat exchanger, which combine to assure extremely high combustion efficiency; EF heavy, cast alloy electric heating elements, EF roller design and mounting, EF special atmosphere generators and many other devices that assure uniform temperature throughout the furnace, accurate control of heat within the required limits, low maintenance, high hourly outputs, and uniform, low cost, dependable operation.

Let EF engineers with their long and outstandingly successful experience work with you on your next heat treating job!

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GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

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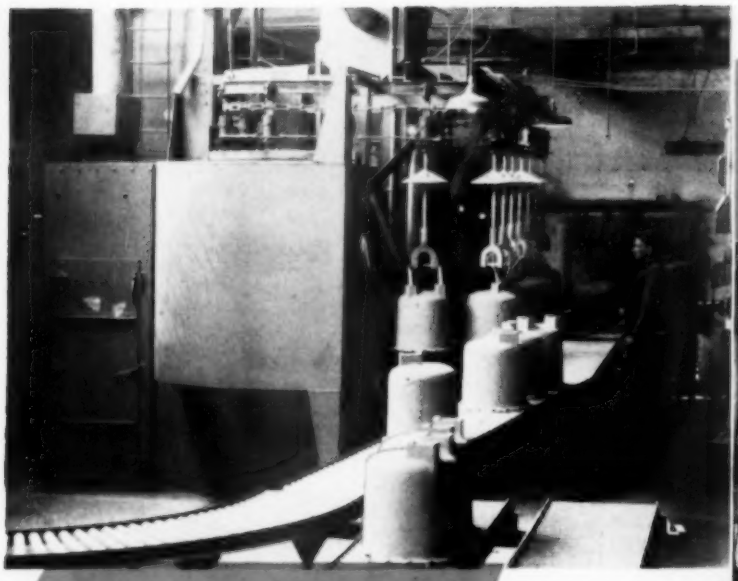
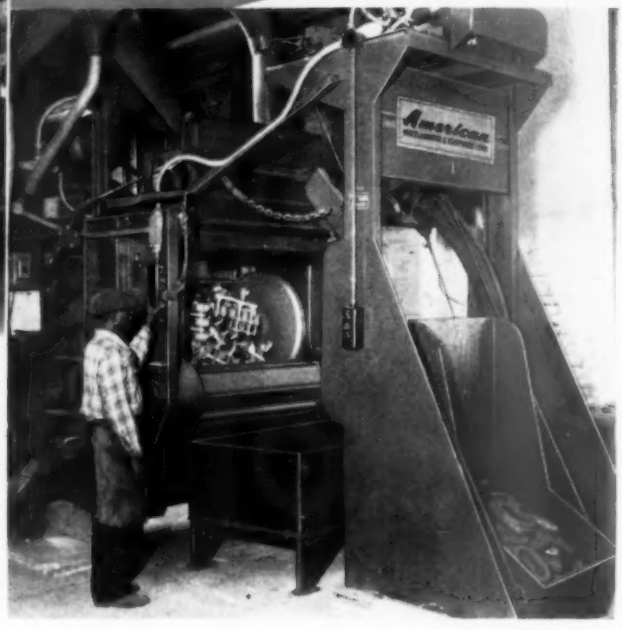


The installation of this Wheelabrator Special Cabinet at the New York Air Brake Company resulted in a 40% savings in the cleaning of air brake castings.



A 37 minute job for this 36" x 42" Wheelabrator Tumblast formerly required 19 hours by airblasting at the Bolmar Corp., Baltimore.

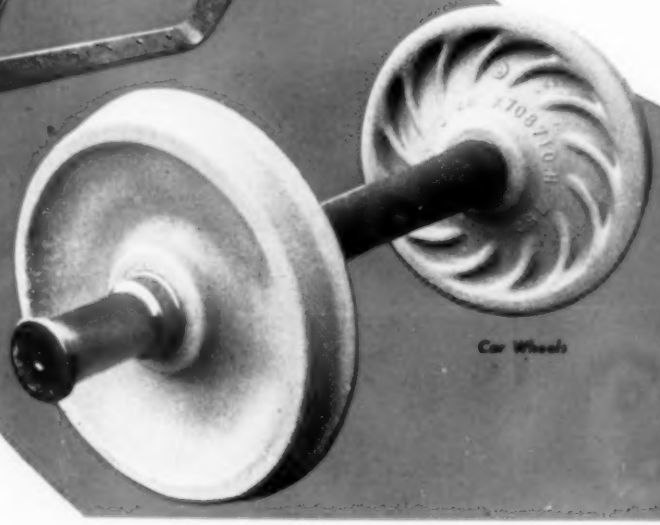
Sleet Scrapers

Brake Shoe Hangers and Holders

Hopper Frame

Railway Castings Like These Are Being Wheelabrated

Locomotive water scoops	Brake wheels	Buffer stems	Draft gear followers
Ratchet wheels	Draft lugs	Yokes	Drawbar carriers
Couplers	Safety-valve parts	Draft sills	Bolster side bearings
Knuckles	Door hinges	Strikers	Truck center plates
Side frames	Rail anchors	Bolster center fillers	Equalizer blocks
Bolsters	Switch stands	Insert blocks	Locomotive spring hangers
Journal boxes	Air brakes	Third rail shoes	Brake shoe heads
Sleet scrapers	Side bearings	Car retarding chairs	Brake rod shoes
Rail braces	Oil cups	Detector car wheels	Rail clamps
Car wheels	Cylinder cocks	Roller plates	Steel chairs
Brakebeam parts	Grease plugs	Chafing plates	Insert blocks
Draft gear parts	Steam pipe fittings	Draw stops	Signal mounts
	Cutter shoes	Bolster hanger keys	



Car Wheels

Journal Box

Car Knuckles

AIRLESS WHEELABRATOR cleans railway specialties in fraction of former time

The speed cleaning of the airless Wheelabrator is playing a vital role in helping to solve the present critical railway car shortage. Its faster more thorough cleaning of all sizes and shapes of castings saves many hours daily in the production of these much needed parts.

for example

At the General Railway Switch Co., Rochester, N. Y., a 36″ x 42″ Wheelabrator Tumblast is cleaning the same amount of work in 16 hours that formerly took 24 hours on 2 airblast tables. This work includes steel castings, cable pulleys, signal mounts, etc.

1500 pound loads of annealed castings are being cleaned in from 10 to 12 minutes by a 48″ x 72″ Wheelabrator Tumblast installed in the Harrison Foundry, Attica, Indiana. Here, the Wheelabrator is cleaning work in 8 hours that took 24 hours to clean by the previous method.

A Wheelabrator Tumblast, installed at the Canadian Bronze Co., Ltd., Montreal, Canada, cleans seventy-five 5″ x 9″ journal bearings, weighing 18 lbs. each, in 4 minutes. Former methods took 30 minutes to clean the same amount of work.

TYPICAL USERS

Acme Steel & Malleable Iron Works
Pratt & Letchworth Co.
American Steel Castings Co.
American Locomotive Co.
Unitcast Corp.
American Brake Shoe Co.
The Griffin Wheel Co.
Pullman Standard Car Mfg. Co.
Canadian Car & Foundry Co., Ltd.
The Locomotive Finished Material Co.
American Car & Foundry Co.
Mangus Metal Division
Timken Roller Bearing Co.
The Baldwin Locomotive Works
Union Switch & Signal Co.
Westinghouse Air Brake Co.
Lenoir Car Works
Norfolk & Western Railway Co.
Electric Steel Castings Co.
Falk Corp.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka, Indiana

World's Largest Builders of Airless Blast Equipment

(*Concluded from page 102*)

assistant manager, has been appointed manager of the Seattle district. Mr. Hamilton became associated with the company in 1930 following graduation from Rice Institute. Previous to 4 years of military service he served in the Houston, Tex., and Los Angeles districts. **Emmett W. MacCorkle Jr.**, assistant manager of gas sales department, New York, since his return from 4 years of navy service in 1945, has been appointed manager of the Portland, Oreg., district. Mr. MacCorkle, a graduate of Washington and Lee, and Cornell Universities, has been with the company since 1935, and formerly served as assistant sales manager in the Cleveland and Wheeling, W. Va., districts.

♦ ♦ ♦

J. C. Peirce has joined Pangborn Corp., Hagerstown, Md., to specialize in the application and development of its hydro-sand blast and core knockout installations. Mr. Peirce has been sales manager and chief foundry engineer, Hydro-Blast Corp., Chicago, for the last 9 years. Prior to that he was associated with Fort Pitt Steel Casting Corp., McKeesport, Pa., and Truscon Steel Co., Cleveland. In 1914 he entered the foundry industry as a special apprentice with Farrel Foundry & Machine Co., Ansonia, Conn., which later became Farrel-Birmingham Co. Inc. Later he was associated with Central Gray Iron Foundry Division, General Motors Corp., at Saginaw, Mich., and was foundry superintendent, National Sanitary Co., Salem, O.

♦ ♦ ♦

Dewey C. Harvey has organized the Harvey Engineering Co., Cleveland, as sales representative for sand and mold handling equipment of the Newaygo Engineering Co., Newaygo, Mich., for northern Ohio, and molding machines and core blowers of Champion Foundry & Machine Co., Chicago, for all of Ohio. Mr. Harvey was associated with the Osborn Mfg. Co., Cleveland, for the last 11 years where he was chief engineer of the conveyor division, design engineer of the machine division and, until recently, sales engineer of the latter division. Prior to joining Osborn Mfg. Co. he served in the engineering departments of the J. T. Tractor Co. and the C. O. Bartlett & Snow Co.

♦ ♦ ♦

Arthur Nutting has been appointed vice president in charge of engineering, American Air Filter Co. Inc., Louisville. Mr. Nutting served a short time with the state highway commission following graduation from University of Kentucky, and became associated with American Air Filter in 1928. Since 1937, when he was appointed chief engineer, he has been in charge of the company's engineering and research programs. **Howard W. Pound** has been appointed vice president in charge of the company's Air Filter Division. Mr. Pound, a graduate of Purdue University, was sales manager of the Independent Air Filter Co., Chicago, when it was acquired by American Air Filter Co. in 1939. He became sales manager of the Electro-Matic Division of the latter company at that time, and was later appointed manager of the Air Filter Sales Division.

♦ ♦ ♦

John M. Otter has been appointed general sales manager, Philco Corp., Philadelphia. Mr. Otter joined the sales department of the company in 1926 and has served as sales representative and manager in various branch offices. He has been sales manager of the Radio Division since 1944, with headquarters in Philadelphia.

♦ ♦ ♦

Louis Falk and **Richard S. Falk** have been elected members of the board of directors, Falk Corp., Milwaukee. Louis Falk, executive engineer, has been associated with the corporation for 10 years and has been secretary since 1942. Richard S. Falk, formerly industrial relations director, is now assistant to the president and is also assistant secretary of the company.

♦ ♦ ♦

J. F. Stevenson, formerly production manager of the Grove City, Pa., plant of the Cooper-Bessemer Corp., Mount Vernon, O., has been appointed assistant works manager, succeeding the late M. A. Winland. Other recent Grove City plant appointments include **W. A. Luli,** production manager; **R. H. Bragg,** assistant production manager; **H. K. Stevenson,** general superintendent; and **W. W. Richards,** chief planner.

♦ ♦ ♦

Clarence E. Hawke has been appointed director of domestic sales, the Carborundum Co., Niagara Falls, N. Y. **Edwin B. Forse** has been named manager of the Refractories Division, and **Boyd H. Johnson,** manager of refractories sales, at Perth Amboy, N. J. **Russell G. Albertson** has been appointed division manager, Canadian Carborundum Co. Ltd., Niagara Falls, Ont.

♦ ♦ ♦

R. D. Decker, formerly associated with Delco-Remy Division, General Motors Corp., Anderson, Ind., has been named general manager, Metal Engineering Co., Indianapolis and Mitchell, Ind.

♦ ♦ ♦

Grant F. Neely and **Harry J. Anderson** have been appointed sales engineers, Vulcan Mold & Iron Co. Latrobe, Pa. **Joseph W. Harvey** has been appointed general sales manager.

♦ ♦ ♦

A. J. Fischer has been named manager of the carbide and cast alloy division, the Jessop Steel Co., Washington, Pa. Mr. Fischer is a graduate of Pratt Institute.

♦ ♦ ♦

Earl P. Kurpier, formerly chief foundry specialist, OPA, covering the sixth district out of Chicago, now is associated with the sales division, Beardsley & Piper Co., Chicago.

J. C. PEIRCE

DEWEY C. HARVEY

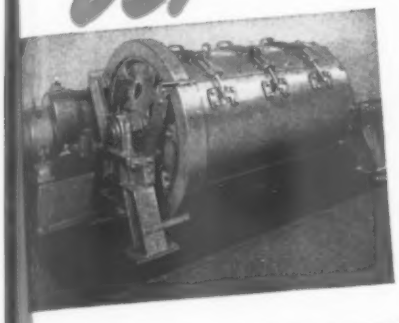
HOWARD W. POUND

ARTHUR NUTTING

For Cleaning *Faster, Better* and at *Lower Cost*

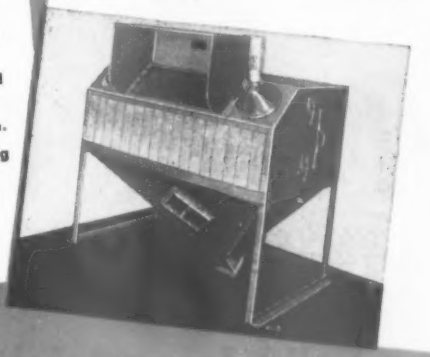
Choose from the SLY Complete Line of Foundry Cleaning Equipment

SLY TUMBLING MILLS



1. Heavy forged steel trunnions, extra heavy roller bearings.
2. Special door locks — easily operated.
3. Extra heavy gearhead motor.
4. Integral motor platform.
5. Loading and unloading from either side.

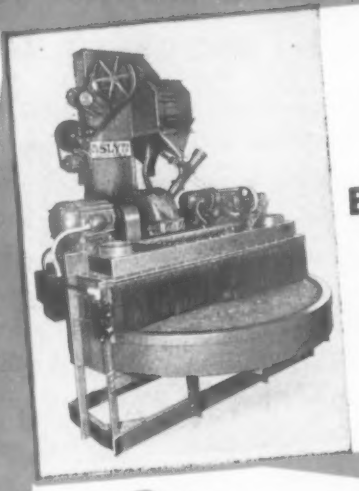
SLY BLAST CABINETS



1. Two lights mounted at front to illuminate castings.
2. Operator's eyes shielded by protective hood.
3. Easy loading and unloading of castings.
4. Used for thorough cleaning of small and intricate parts, or as an auxiliary to larger units.

SLY BLAST ROOMS

1. Overall down-draft ventilation.
2. Ample illumination.
3. Lined throughout with 3-16" wear plates.
4. Floor of grating and perforated plates.



SLY AIRLESS BLAST CLEANING EQUIPMENT

MILLS AND TABLES

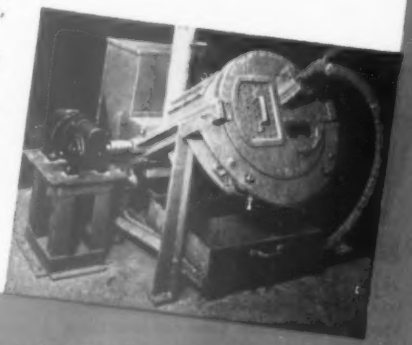
Exclusive wheel features for fast and economical cleaning.

SLY DUST FILTERS

1. More filter cloth—hence greater filtering capacity.
2. Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal.
3. Simpler shaker mechanism—less moving parts, less maintenance.
4. Bags more easily replaced.
5. Automatic control — any degree.

SLY BLAST MILLS

1. Handles quantities of castings, forgings, stampings, hardened steel parts.
2. Tilted barrel with rolling action.
3. Convex perforated bottom plate forms bottom of barrel.
4. Work is constantly turned bringing bottom pieces to top.
5. Stationary head of barrel has large door for loading.



70 YEARS OF SERVICE TO THE FOUNDRY INDUSTRY

THE W. W. SLY MANUFACTURING CO.

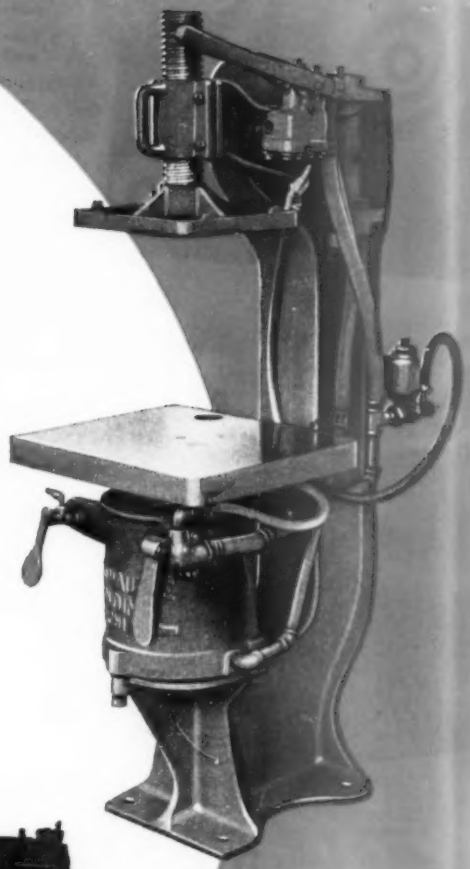
4753 TRAIN AVENUE ★ CLEVELAND, OHIO

DON'T GAMBLE WITH *Accuracy*

MILWAUKEE JOLT SQUEEZERS

. . . Give you a Solid Impact Jolt and Maximum Squeeze Pressure at All Times

Why take chances producing ram-offs in your molding operation? Ram-offs are impossible with Milwaukee Jolt Squeezers. The arm has direct contact with the back frame when pressure is applied squaring up the platen with the table. The squeeze valve is on the arm for safe and convenient operation. The jolt and vibrator valves are knee operated. Simple in design . . . ruggedly constructed . . . and machined to close tolerances . . . these dependable Jolt Squeezers enable you to produce BETTER MOLDS in LESS TIME. Compare them, point for point, with any other Jolt Squeezers on the market.

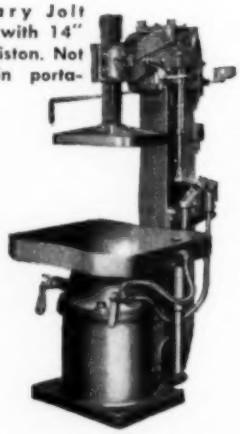


New Bulletin No. 118

Just off the press. Gives complete description and specifications of Milwaukee Jolt Squeezers. Send for your copy.

No. 142JS

Stationary Jolt Squeezer with 14" squeezing piston. Not available in portable type.



No. 103

Stationary Jolt Squeezer with 10" squeezing piston. Accessible from 3 sides.

No. 124

Portable Jolt Squeezer with 12" squeezing piston, steel wheels and mold shelf.

PROMPT SHIPMENT

. . . . of 10" and 12" Sizes

MILWAUKEE Foundry Equipment Co.

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

Study Nonferrous Metal Problems

Twenty plant superintendents and production executives of the Federated Metals Division, American Smelting & Refining Co., New York, representing 11 plants, met at the Hotel Pennsylvania, New York, May 12-16, for discussion of various production problems and methods. The meeting was the third in a series started in 1943. John A. West, manager of technical operations, and his staff, presided.

Superintendents included: L. D. Alpert, San Francisco; C. T. Clore, St. Louis; L. C. Herlinger, Houston, Tex.; A. F. Kohn Jr., Los Angeles; W. C. Larson, Detroit; R. G. Lenhart, Pittsburgh; J. F. McQuillan, Perth Amboy; F. J. Menninger, Newark, N. J.; A. S. Wigle, Whiting, Ind.; C. G. Heuter, Trenton, N. J.; and J. Granberg, Beckemeyer, Ill. Others in attendance were Tom R. Lister, chief engineer; F. J. Owen, standardization engineer; A. A. Smith Jr., superintendent of the research department; Ray A. Quadt, research metallurgist; E. D. Mooney, service engineer; and A. E. St. John, manager, advertising and sales promotion.

Foundry Statistics

(Reported by Bureau of the Census)

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold	*Orders
1946				
Jan.	72,265	65,107	1,886	71,827
Feb.	60,856	56,992	1,713	72,736
Mar.	74,971	66,076	2,353	70,622
Apr.	77,919	71,105	2,390	71,108
May	76,054	70,748	2,453	76,792
June	70,910	66,378	1,755	78,449
July	66,695	62,369	2,339	78,018
Aug.	77,733	72,158	2,376	77,538
Sept.	76,835	71,545	2,415	84,183
Oct.	89,148	83,610	2,559	80,770
Nov.	77,605	72,671	2,159	79,126
Dec.	77,961	73,278	2,122	80,445
1947†				
Jan.	85,783	80,524	2,164	78,874
Feb.	78,729	73,863	2,046	76,016

* For sale only.
† 1947 figures include copper and copper-base alloy castings.

Gray Iron Castings

(Net tons)

	Shipments		Unfilled
	Total	For sale	*Orders
1945			
Jan.	861,524	536,499	1,921,572
Feb.	816,467	511,184	1,998,270
Mar.	927,925	587,380	2,089,046
Apr.	842,979	532,015	2,031,668
May	866,951	542,337	2,031,318
June	849,449	543,788	2,015,625
July	748,790	468,017	2,015,005
Aug.	750,050	462,364	1,817,801
Sept.	717,768	434,416	1,754,515
Oct.	787,209	461,720	1,741,981
Nov.	751,092	445,952	1,847,468
Dec.	678,091	397,529	1,877,095
1946			
Jan.	706,319	446,567	2,076,994
Feb.	541,177	368,384	2,152,766
Mar.	796,068	505,431	2,265,336
Apr.	856,678	529,323	2,378,348
May	757,041	454,194	2,491,811
June	735,060	435,866	2,633,118
July	810,829	475,059	2,668,782
Aug.	944,516	558,957	2,785,609
Sept.	913,824	534,310	2,881,906
Oct.	1,051,068	610,389	2,916,268
Nov.	964,300	552,696	2,888,219
Dec.	889,479	505,728	2,952,203
1947			
Jan.	1,056,050	624,511	2,983,699
Feb.	993,605	575,048	2,948,813
Mar.	1,079,140	630,028	2,963,319

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold	*Orders
1945				
Jan.	45,588	27,168	10,692	.....
Feb.	44,091	26,674	9,844	.....
Mar.	50,275	29,473	12,355	.....
Apr.	46,320	27,090	11,185	.....
May	43,323	24,398	10,977	.....
June	39,074	21,050	10,254	.....
July	31,130	15,573	8,859	.....
Aug.	22,845	11,384	6,568	.....
Sept.	15,805	7,313	5,325	.....
Oct.	19,825	8,410	7,647	.....
Nov.	18,961	8,137	7,305	.....
Dec.	17,770	7,222	7,248	.....
1946				
Jan.	23,568	9,556	10,131	83,541
Feb.	23,231	11,613	7,866	94,858
Mar.	26,661	10,792	11,305	97,013
Apr.	27,692	11,562	11,010	100,267
May	29,179	11,827	12,220	117,710
June	28,496	11,674	11,767	118,747
July	28,828	10,706	12,213	124,457
Aug.	33,845	12,721	14,309	133,510
Sept.	32,003	12,445	13,045	136,237
Oct.	39,917	14,559	17,311	144,276
Nov.	35,635	13,192	15,440	138,270
Dec.	34,754	12,827	14,586	137,198
1947				
Jan.	39,438	14,030	16,902	131,368
Feb.	35,904	12,936	15,148	128,999

* For sale only.

Magnesium Castings

(Thousands of pounds)

	Shipments			Unfilled
	Total	Sand	Perm. Mold*	Orders†
1945				
Jan.	10,424	6,149	4,028	....
Feb.	10,366	5,832	4,317	....
Mar.	12,646	6,703	5,677	....
Apr.	11,903	6,257	5,464	....
May	12,134	6,081	5,865	....
June	10,566	4,878	5,473	....
July	9,838	3,961	5,677	....
Aug.	4,960	1,820	3,036	....
Sept.	169	137	13	....
Oct.	251	216	13	....
Nov.	236	208	15	....
Dec.	261	230	14	....
1946				
Jan.	398	349	16	3,114
Feb.	438	366	35	3,338
Mar.	594	525	33	3,484
Apr.	570	485	36	3,297
May	661	587	45	3,778
June	717	623	46	4,063
July	628	477	53	3,986
Aug.	694	568	56	4,234
Sept.	811	676	61	4,096
Oct.	921	733	73	4,219
Nov.	716	574	41	4,294
Dec.	717	655	28	4,599
1947				
Jan.	809	723	40	4,480
Feb.	707	605	69	3,776

* Includes incendiary bomb castings.
† For sale only.

Malleable Iron Castings

(Net tons)

	Shipments		Unfilled
	Total	For Sale	*Orders
1945			
Jan.	78,788	54,111	345,112
Feb.	75,220	51,089	341,558
Mar.	85,307	58,711	349,935
Apr.	76,065	51,011	346,421
May	79,565	52,789	328,471
June	71,992	47,510	285,210
July	55,813	35,439	284,017
Aug.	52,647	33,239	282,136
Sept.	46,960	28,506	219,905
Oct.	59,096	37,307	229,618
Nov.	57,315	36,007	227,309
Dec.	51,963	35,168	236,648
1946			
Jan.	54,016	38,181	245,878
Feb.	40,155	29,326	248,644
Mar.	50,235	33,978	263,227
Apr.	65,010	36,298	267,713
May	62,598	34,975	271,925
June	61,650	35,468	275,845
July	64,446	38,021	271,981
Aug.	67,903	41,345	272,440
Sept.	69,507	39,631	277,309
Oct.	79,207	46,477	280,972
Nov.	68,987	39,328	278,446
Dec.	68,314	39,327	267,661
1947			
Jan.	75,898	42,414	259,764
Feb.	74,716	41,684	274,018
Mar.	76,614	43,488	280,724

* For sale only.

Steel Castings

(Net tons)

	Shipments		Unfilled
	Total	For Sale	Orders
1945			
Jan.	210,213	165,116	983,137
Feb.	191,361	152,082	1,045,374
Mar.	222,591	173,506	1,047,660
Apr.	197,737	154,883	1,018,930
May	192,921	149,623	852,877
June	173,685	129,193	776,265
July	139,315	102,428	728,397
Aug.	131,411	98,080	565,559
Sept.	114,613	83,751	513,758
Oct.	130,344	99,495	460,339
Nov.	123,048	91,409	443,773
Dec.	115,239	85,391	434,287
1946			
Jan.	99,058	77,071	*358,926
Feb.	57,423	45,151	390,077
Mar.	101,398	80,843	412,325
Apr.	146,327	108,586	392,790
May	129,211	94,630	381,654
June	123,551	91,715	361,293
July	119,157	84,422	362,581
Aug.	130,450	94,653	374,731
Sept.	126,415	90,675	383,951
Oct.	138,206	98,945	389,002
Nov.	130,813	93,930	378,631
Dec.	122,219	87,238	353,860
1947			
Jan.	139,029	101,140	365,476
Feb.	125,612	92,822	421,405
Mar.	134,909	99,701	434,865

* For sale only. Unfilled orders for 1945 include tonnage for sale and own use.

FOUNDATION FUND DRIVE

For Engineer Training Begins

THE Foundry Educational Foundation Campaign for $280,000 to launch special foundry industry engineering training courses at five American engineering colleges in September, and to establish fifty scholarships among these schools each year during the next three years is now under way.

Some fifty industry leaders in all parts of the United States are serving as regional co-chairmen to help John M. Price, Ferro Machine & Foundry Co., Cleveland, campaign chairman. These men will cover all the foundrymen, suppliers, equipment manufacturers and others who may be interested, for contributions to this program designed to help solve the tough problem of continuing the supply of trained manpower on the management and supervisory levels.

On May 8, the Foundry Educational Foundation held its first annual meeting in Cleveland at which time four new trustees were elected and a full slate of officers were named. The Foundry Equipment Manufacturers Association joined the American Foundrymen's Association, the Gray Iron Founders' Society and the Malleable Founders' Society as founding members of the foundation.

The new officers named at the annual meeting election are: President, Anthony Haswell, Dayton Malleable Iron Co., Dayton, O.; vice president, Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O.; secretary, James H. Lansing, Malleable Founders' Society, Cleveland; treasurer, W. M. Caldwell, Gray Iron Founders' Society, Cleveland; and trustees: Ben D. Claffey, General Malleable Corp., Waukesha, Wis.; Richard W. Crannell, Lehigh Foundries Inc., Easton, Pa.; Mr. Haswell; Mr. Price; Mr. Rentschler; Fred G. Sefing, International Nickel Co., New York; James W. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich.; Stowell C. Wasson, National Malleable & Steel Castings Co., Cicero, Ill.; James T. MacKenzie, American Cast Iron Pipe Co., Birmingham; Bruce L. Simpson, National Engineering Co., Chicago; George Hutchins, Standard Foundry Co., Worcester, Mass.; and Otto A. Pfaff, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

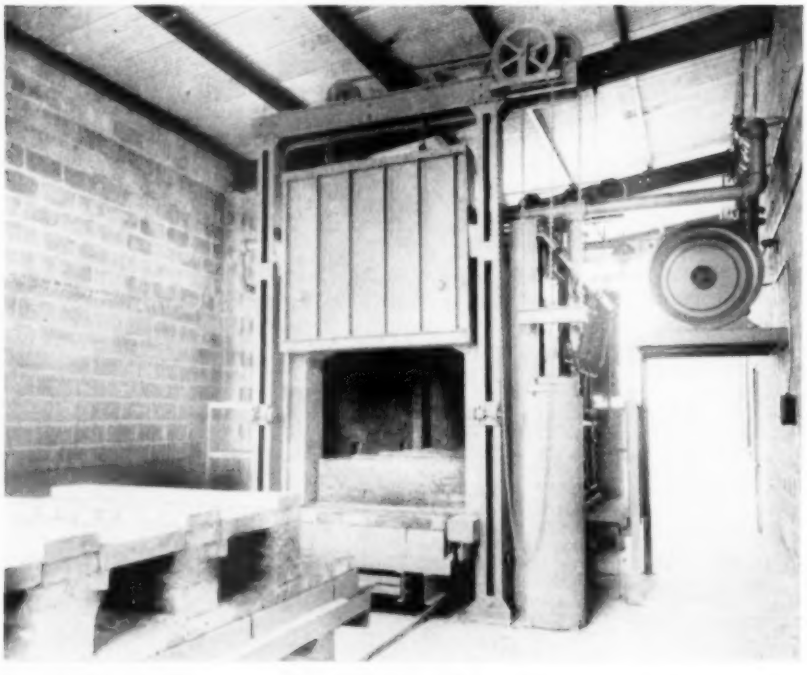
Listed among the regional co-chairmen who are working on the national campaign are the following:

C. S. Humphrey, C. S. Humphrey Co., Moline, Ill.; Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill.; John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; Frank W. Shipley, Caterpillar Tractor Co., Peoria, Ill.; Leon J. Wise, Chicago Malleable Castings Co., Chicago; Edwin W. Horlebein, Gibson & Kirk Co., Baltimore; H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J.; F. H. Rayfield, Potter & Rayfield Inc., Atlanta, Ga.; Ben D. Claffey, General Malleable Corp., Gray Iron Division, Waukesha, Wis.; B. G. Parker, Youngstown Foundry & Machine Co., Youngstown, O.; Henry S. Washburn, Plainville Casting Co., Plainville, Conn.; E. N. Harrison, Harrison-Corry Co., Knoxville, Tenn.; Fred G. Sefing, International Nickel Co., New York; J. W. Silver, Ogden Iron Works Co., Ogden, Utah; A. F. Fries, Peru Foundry Co., Peru, Ind.; R. H. Bancroft, Perfect Circle Co., New Castle, Ind.

J. A. Luby, Gartland Foundry Co., Terre Haute, Ind.; E. A. Herr, Servel Inc., Evansville, Ind.; Frank S. O'Neil, Link-Belt Co., Indianapolis; J. E. McIntyre, Sibley Machine & Foundry Corp., South Bend, Ind.; Edward A. Walda, Central Foundry Co., Ft. Wayne, Ind.; J. H. Young, Centre Foundry & Machine Co., Wheeling, W. Va.; Elliott F. Metcalf, Westmoreland Malleable Iron Co., Westmoreland, N. Y.; J. H. Pohlman, Pohlman Foundry Co., Buffalo; Gregory Brunk, Headford Brothers & Hitchins Foundry Co., Waterloo, Iowa; Robert Ward, American Car & Foundry Co., Huntington, W. Va.; Ray J. Redmond, Buckeye Foundry Co., Cincinnati; Herman P. Good, Textile Machine Works, Reading, Pa.; A. W. Schlegel, Ideal Pattern Works, St. Bernard, O.

E. M. Francy, Toronto Foundry & Machine Co., Toronto, O.; George E. Bean, Eastern Malleable Iron Co., Wilmington, Del.; George F. Hutchins, Standard Foundry Co., Worcester, Mass.; R. E. Kucher, Olympic Foundry Co., Seattle; Carl F. LaMarche, American Malleable Casting Co., Marion, O.; E. C. Hoenicke, Eaton Mfg. Co., Foundry Division, Detroit; Richard W. Crannell, Lehigh Foundries Inc., Easton, Pa.; C. R. Culling, Carondelet Foundry Co., St. Louis; Anthony Haswell, Dayton Malleable Iron Co., Dayton, O.; and Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O.

"Playing Both Ends Against the Middle"



IN the heat treatment of high alloy castings at 2100 F, the Cooper Alloy Foundry Co., Hillside, N. J., reports savings in fuel, floor space and time through the furnace design shown here. Furnace builder, R-S Products Corp., Philadelphia, has designed the furnace with doors at both ends and duplicate car hearths. Thus, while one car is in the furnace and the charge is being heated, the other can be unloaded and reloaded, so that no time is lost.

As a result, the fuel normally required to hold an empty furnace at heat while the charge is being rearranged is all saved, a smaller furnace can produce more tonnage per day and furnace life is increased because less violent heating and cooling occurs in the furnace chamber (there is always a full hearth and load in position). The fuel is propane; the door opening at each end is 5 ft wide and 3 ft high, above the car piers; the heating chamber is 9 ft long.

Redford CORE BLOWER CARTRIDGE TYPE

A few of the thousands of cores that are made daily on Redford Core Blowers.

• PROVEN •

Hundreds of foundries are using **Redfords** as an efficient low cost means of producing small cores. The high percentage of reorders we receive proves that **Redfords** are profitable to own.

• SIMPLICITY •

The Redford reduces core blowing to its simplest form. Anyone can understand—operate and maintain it.

• SPEED •

All the work of handling core box and driers is done on the machine. Cartridges can be quickly loaded by hand. As many as 200 boxes are being blown and drawn by one operator in one hour.

• FLEXIBILITY •

With a Redford you can make any number of different cores without loss of time for changeovers. Here is what a large jobbing foundry has to say: "We are using 7 Redfords. Your development of the portable cartridge which can be made a part of the core box equipment, has given us all the advantages of core blowing without loss of flexibility so essential to us."

SAND CARTRIDGES AVAILABLE IN 10 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in nine additional standard sizes and special sizes furnished where needed.

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Around DETROIT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Hundreds visit Detroit foundries during AFA convention . . . . Several automotive plants are using chemically bonded sand . . . . Process control engineers strive to overcome poor quality materials

GENERAL consensus here was that the 3200 visitors to the fifty-first annual AFA convention were the most inquisitive and serious-minded group ever to attend a meeting of this type. All technical sessions were well attended despite humidity which at times seemed near the dew-point. Fleets of buses and taxicabs were kept busy most of the week moving visitors to and from a score or more of local plants which held open house. H. M. Bringhurst, Semet-Solvay Co., chairman of the plant visitation committee, reports well over 300 were taken on scheduled tours through the Cadillac and Packard foundries, while approximately 1000 other separate plant trips for smaller groups were arranged. All-in-all, the crowd was in a seeing and learning mood, resulting in a considerable soft-pedaling of the usual social side of these conventions.

The Cadillac foundry, glistening after completion of a multi-million dollar program of modernization and rearrangement, proved a real show spot, particularly from the standpoint of ideal working conditions. Ample room, plenty of light, higher roofs and engineered ventilation combine to produce something new in high-production gray iron foundries. Mechanization of all operations is estimated to have been carried out to 85-90 per cent, compared with 30 per cent in the old Cadillac foundry built a quarter of a century ago.

A pictorial story of the foundry will appear in the July issue of THE FOUNDRY, but a few details on the plant may be apropos at this time. Cupolas are charged by skip hoists, raw material storage being arranged so that only a craneman and a weigh car operator are required to handle the entire operation, in contrast to a crew of a dozen or more formerly, some of them working on the charging platform. Cupolas tap into holding ladles, from which electric monorail crane ladles carry iron to pouring stations.

There are four castings lines, one for cylinder blocks, one for small hard iron parts, a third for large soft iron parts and a fourth for small soft iron components, the latter three being hand poured. Sand-slingers fill molds on the hard iron lines; jolt roll-over squeeze machines on the soft iron lines. Coreblowers handle core-making, and all core sand is reclaimed, as well as about 75 per cent of all molding sand.

A 60-foot wet tumbling mill and sorting conveyor, from which castings are sorted and fall into containers through separate chutes, drew admiring glances from many visitors, as did a new bridge-type normalizing furnace for stress-relieving cylinder blocks as they come from the shakeout.

A high point for the week, in the opinion of many conventioneers, was the specially-arranged visit to the Ford Motor Co. production foundry, arranged by a Ford committee under the direction of R. H. McCarroll. In addition to providing a fleet of buses to take the party of 650 to and from the plant, the company provided 40 or more guides to take small groups through the foundry and explain operations in detail, set up large displays showing all the castings used in passenger cars and trucks, and arranged a full-course luncheon at Dearborn Inn. Frank Riecks of the Ford plant layout staff spoke at length following the luncheon, detailing production facilities and problems. Fred J. Walls, International Nickel Co., Detroit, acknowledged the company's hospitality for the A.F.A.

Easily the most entertaining and persuasive banquet speaker ever to appear before an A.F.A. annual banquet, A. H. "Red" Motley, publisher of *Parade*, gave foundrymen something to think about in his rousing address. His contention that tradition is too often a liability rather than an asset in business might well be re-echoed in sentiment and in practice by many sections of the foundry industry. A sharp, clean break with traditional methods often proves the key to unsuspected profits, whether it be in production of castings or selling shirts.

A break with tradition, first mentioned in this department in October and November, 1945, and originating in the Detroit area, is the Westonite method of chemically coating molding sand, described in full on page 66 of the May issue of THE FOUNDRY. When Bonny Weston first conceived his idea and approached local foundrymen with the idea of trying it out, he knew little of accepted foundry practice. He was a chemist who thought he had a way of preparing molding sand that would save money, produce better castings and lessen the dirt problem in the foundry. Early experiments at Wilson Foundry & Machine Co. in Pontiac were promising as far as the castings were concerned, but there were numerous bugs in the idea—flashing at the shakeout, sand sticking in the system, etc.—so the process languished until Weston took it down to Lynchburg Foundry Co. in Virginia and went to work in earnest with a capable metallurgist there, Tom Curry.

Single Kink Unlocked Door

It took many months of research and experiment to bring the process to its successful culmination, the key to the entire problem being a change in the type of coating material to make it water soluble whereas the original Westonite was not. That single little kink unlocked the door to the potentialities of the process which now have intrigued the entire industry.

Cadillac, for instance, now has its small parts line equipped for using the chemically treated sand, is in process of equipping a second line, and by fall may be using this type of sand in its entire system, including cylinder blocks. Buick at Flint has set up a small parts line for chemically bonded sand, but has bumped into the need for more sand mullers since in the process the entire sand load must be mulled, instead of just facing sand, as has been the Buick practice. Once additional mullers are installed, it is believed the method will move fast there. Pontiac likewise is planning installation of the system on one of its lines.

(*Concluded on page* 114)

Phones Speed Delivery

City Pattern Foundry & Machine Co., Detroit, recently equipped its trucks with mobile telephone service. This is one of the first general commercial installations of this modern time-saving device. Vaughan Reid, president, reports a check has shown that the service has greatly increased the efficiency of the company's delivery and pickup system.

Foundry Conveying is a *Rough Game*

FOUNDRY CONVEYERS must be designed and built to operate under severe service. Gravity and power conveyers to be applied in this industry should have extra weight and strength built into them if they are to stay on the job. Because Mathews Engineers know foundry conveying problems, Mathews Conveyers are found in most of the great brass, steel and gray iron foundries in the United States and Canada, operating under extremely rough conditions, with a minimum of costly maintenance attention.

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(*Concluded from page 112*)

Lynchburg Foundry is now attacking the problem of using the material in core sand, and the outlook is hopeful although requiring considerably extended study. If eventually successful, the automotive foundries probably will move in a similar direction.

Glancing ahead, it would appear that if the sand treatment system progresses to the degree which now looks likely, the problem will be sources of supply for the coating material, since one plant alone like Cadillac might require four or five carloads a week. Presently, all rights to the manufacture and sale of this bonding material are held by Eastern Clay Products Co.

• • •

FIELD reports of cracked blocks in 1946 and 1947 model passenger cars are more numerous than in prewar years, a condition that could hardly be otherwise in view of the unending difficulties which gray iron foundrymen have had with raw materials and supplies. Lack of uniformity in coke and pig iron analyses has been particularly bothersome and calls for careful attention on the part of control staffs. Scrap percentages in many automotive foundries are far beyond anything experienced prewar, and the likelihood of cylinder blocks getting by hydrostatic inspection and later having hairline cracks in cylinder walls open up with resultant defection of the engine has been greatly enhanced.

Larger plants have so-called process control engineers whose duty it is to keep careful check on materials and procedures in the foundry to assure high quality of the product. These days the life of the process control engineer must be a hectic one. At any rate, C. L. Stevens, head of the Ford process control department, recently explained to the Detroit Chapter of the American Society for Metals some of the details his engineers concern themselves with in foundry operations. They include:

Constant check on material specifications—coke, pig iron, steel scrap, sand, oils, binders, washes, etc.

Inspection of cupola repairs, with particular attention to rebuilding of tuyeres, height of slag hole, location of tap hole and all specified dimensions.

Daily checking of scales for accuracy and cleanliness.

Close watch on cupola charge height, blast supply and tapping time.

Frequent inspection of fractured chill test pieces for depth of chill to determine correctness of metal composition.

Following through on corrective inoculant additions to ladles.

Frequent examination of sand mixes for moisture, bond, permeability, strength, and proportion of additive materials.

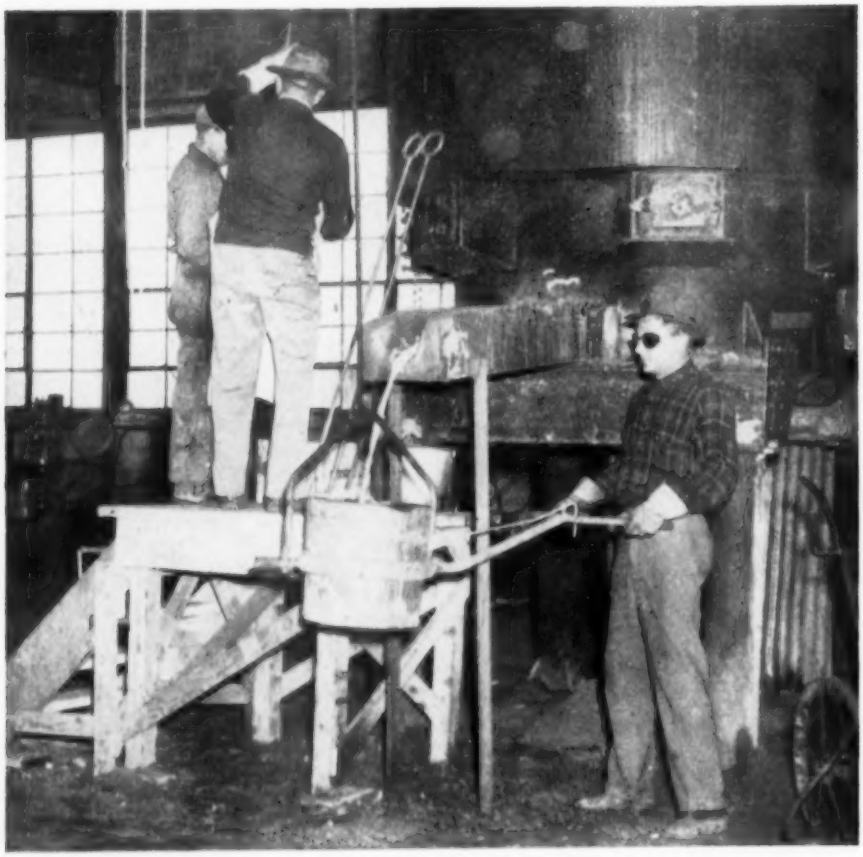
Issuing of specifications for core vents, showing location and size.

Since Ford uses a variety of core sand mixes, the innovation has been adopted of mixing with them dyes of various colors for identification purposes and routing to proper core stations.

• • •

ONE OF the automotive foundries which had been experiencing heavy losses on engine cores, occasionally as high as 40 to 50 per cent, has been meeting considerable success with coatings consisting principally of tellurium oxide. One instance is reported of a check made on a group of cores with the new coating, where losses had been reduced to 4-7 per cent.

New Gray Iron Foundry Taps First Metal



INLAND Gray Iron Foundry, Watertown, Wis., first poured metal Feb. 13. John Budde, firm president, is shown filling a bull ladle with iron from the cupola spout. Myron Ross, plant superintendent, is standing on the cupola platform.

Construction of the new 80 x 120 ft foundry building was started last fall and was completed for use early in February. The cupola has a capacity of 30 tons of metal daily. Modern equipment has been installed throughout the plant. About 25 persons will be employed when the foundry is in full operation.

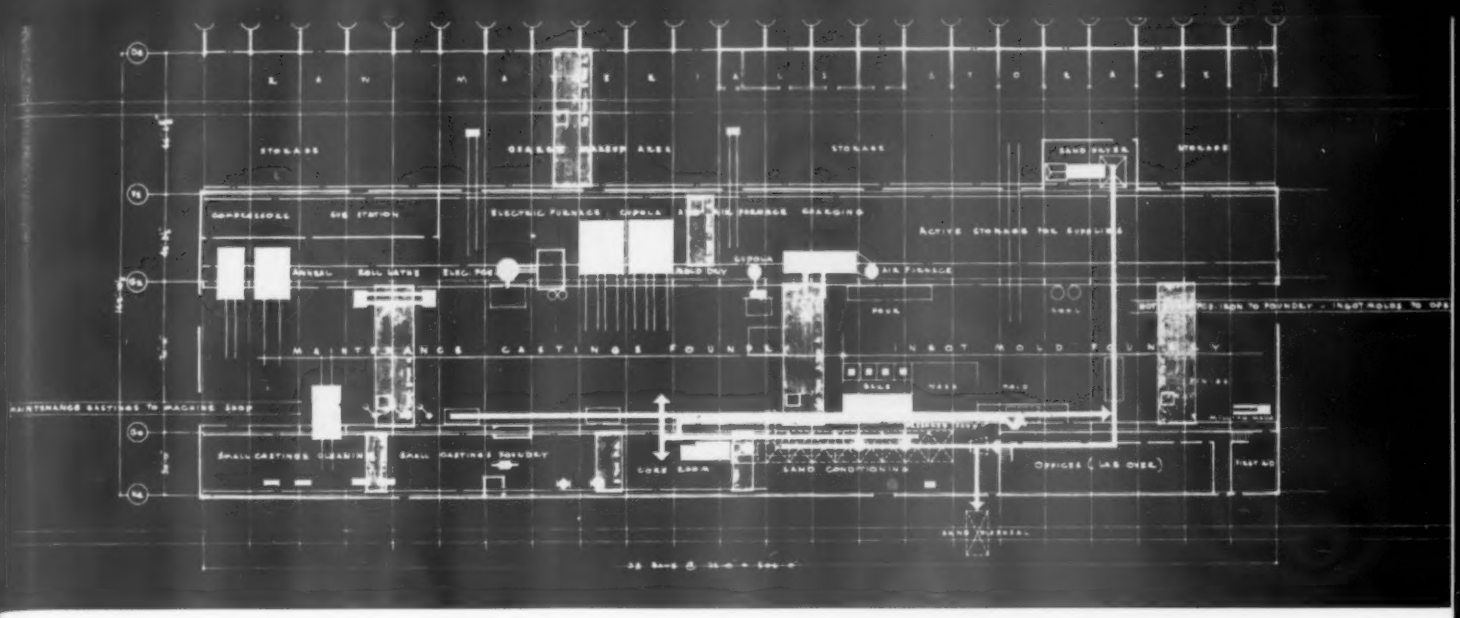
Mr. Budde was previously in the foundry business in Milwaukee, and Mr. Ross is an experienced foundryman from Marinette, Wis. Harley Whittmore Jr. is office manager of the company.

Book Review

Laboratory Manual in Metallography, by John F. Eckel and Robert J. Raudebaugh, paper, 344 pages, 8 1/8 x 10 7/8 inches, published by McGraw-Hill Book Co. Inc., New York. Price $4.50.

Experiments presented in this manual are those used in a series of three courses given to metallurgical engineers at Purdue University over a period of six years. They have been designed to present necessary techniques in metallography, general fundamental principles involved in mechanical and thermal treatment of alloys, common treatments of representative nonferrous alloys, and common treatments of representative alloys.

First four experiments deal with the microscope, polishing technique and photographic principles. Experiments 5 to 13 are on the more important basic principles of physical metallurgy. Experiments 14 to 26 are devoted to representative nonferrous materials, and experiments 28 to 42 cover representative ferrous materials. Throughout the manual data sheets are provided to mount micrographs with pertinent data, and where required graph paper is included.



Under Construction—Ingot Mold, Roll, and Maintenance Foundry—Brazilian National Steel Company, Volta Redonda, Braz

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. . . relating these requirements to the characteristics of the building site, climate, labor conditions and the availability of equipment, materials, manpower and utilities.

. . . economics studies of the benefits of high production equipment and mechanized operation as against increased capital costs and maintenance burdens.

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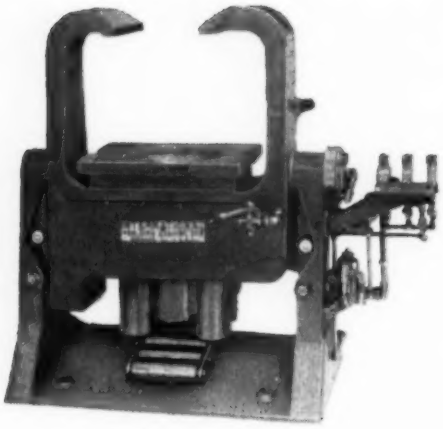

Type REJ

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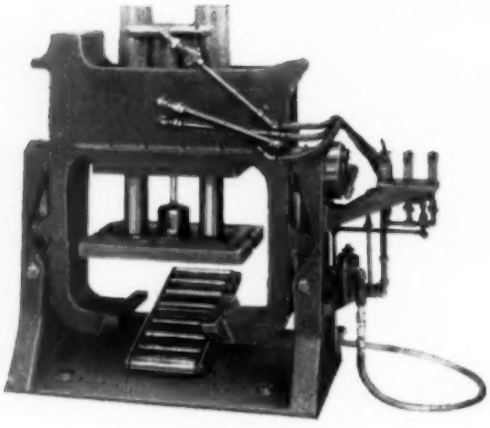
With INTERNATIONALS the principle of Double Jolt Sections tied together has been in practice for over 10 years.



● The development of even ramming of mold...no ram-off... sand packing to top of flasks (with upset of required height.)

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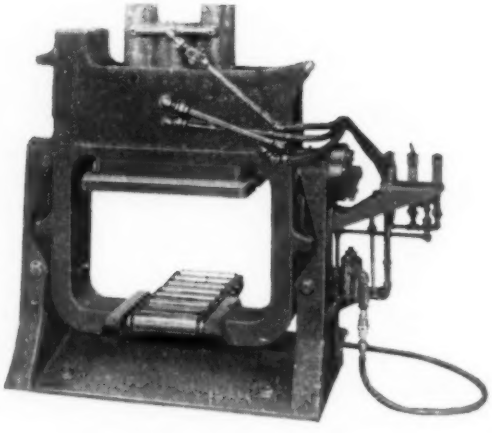

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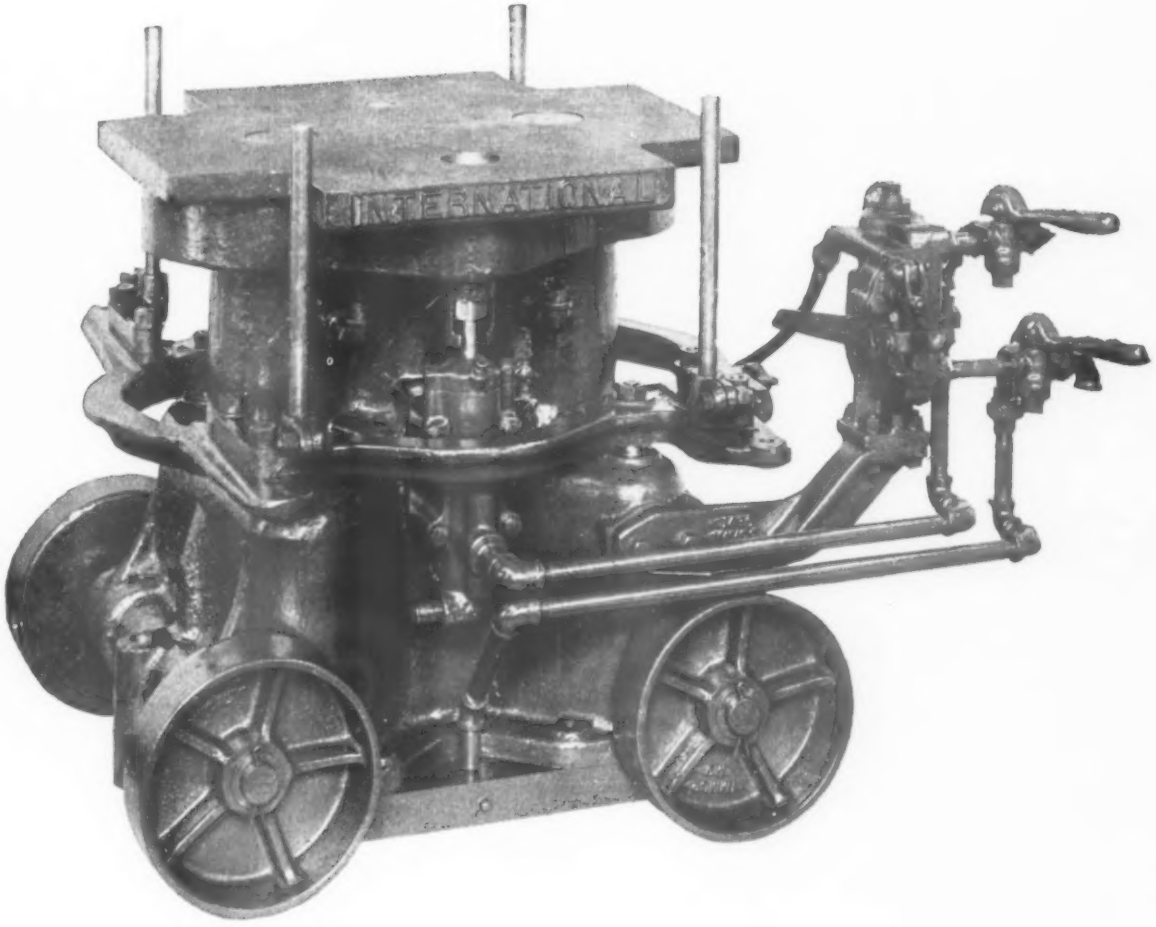

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A perfect companion to INTERNATIONAL'S "REJ" . . . a Double Jolt Pin Lift Cope Machine easily adjustable for different jobs, perfect for long runs. Low maintenance cost. Tried and proven by foundrymen in every section of the country. - *An Ideal Pair!*

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Foundry Developments

By EDWIN BREMER

OXYGEN generator installed in the Milwaukee Steel Division, Grede Foundries Inc., Milwaukee, some months ago now is supplying sufficient oxygen to perform all oxyacetylene welding operations. The generator supplied by Air Products Inc., Emmaus, Pa., consists essentially of an electrically driven air compressor and heat exchanger unit as shown in the accompanying illustration. Highly compressed air suddenly expanded is caused to liquefy. Nitrogen is distilled off leaving liquid oxygen which is converted to the gaseous state and piped to various operating locations in the foundry. Generator at Milwaukee Steel produces about 750 cu ft per hr.

° ° °

SMALL amount of boron added to certain alloy steels or used as a partial replacement for molybdenum in the same steels increase their hardenability, according to a report available from the Office of Technical Services, Department of Commerce, Washington 25. Written by M. C. Udy and P. C. Rosenthal, Battelle Memorial Institute, it discusses tests on 100 boron-treated steels which included nickel-chromium-molybdenum and manganese-molybdenum types in cast and wrought stock. The report, PB-16076, photostat $5, microfilm $1, indicates that from the standpoint of hardenability best results were obtained with additions of 0.0015 to 0.002 per cent B. Boron additions had no apparent adverse effect on notch-bar toughness at temperatures down to minus 80 F. A boron addition of 0.0015 to 0.003 per cent could be used to replace half of the Mo in aluminum-killed steels of certain compositions. Full deoxidation of the melt was required to avoid inconsistent results from the boron addition.

° ° °

PROPOSED revision of Simplified Practice Recommendation R185-42, Pipe Fittings, has been developed in cooperation with manufacturers of those fittings and the Division of Simplified Practice, National Bureau of Standards. Applying to gray cast iron, malleable iron and brass or bronze fittings the proposed revision includes a comprehensive group of fittings required for sprinkler systems in addition to regular lines for other purposes. The section dealing with brass or bronze fittings has been adjusted to provide for sectional as well as general needs. Mimeographed copies of the proposed revision may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

° ° °

CONSISTENTLY strong silver brazes can be produced without detriment to metal or danger to the brazing operator by using a control flux composed of 50 per cent potassium tetraborate, 30 per cent potassium acid fluoride, 15 per cent potassium fluoborate and 5 per cent boric acid, according to a report now on sale by the Office of Technical Services, Department of Commerce, Washington 25. Report PB-40296 "Control Flux Composition for Silver Brazing—Navy Specification 51F4" (photostat $3, microfilm $1) states that the flux is believed to satisfy all requisites for a standard flux for silver brazing alloys flowing at temperatures up to 1300 F, and with some limitation in flux film persistence, up to 1400 F, and therefore adequate for the majority of commercial silver brazing alloys.

° ° °

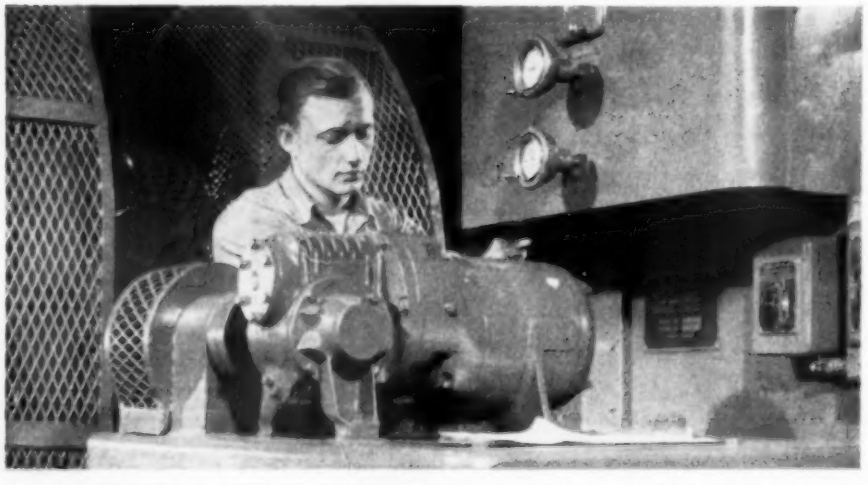
EMPLOYMENT of a hot-blast, gas-producer cupola in France has been described recently. Cupola is mentioned as being lined with an alloy steel cylinder 5 ft in diam and 13 ft high which is water cooled. Top of the cupola is closed except when metal and fuel charges are introduced. Other equipment includes dust catcher and air preheaters. Charge composition is given as 20 parts high ash coke, 65 parts high ash anthracite coal, 15 parts limestone flux, and 100 parts scrap iron. Hourly output includes 115,000 cu ft of 140 Btu gas of which 15 per cent was consumed in the preheaters, 450 lb slag, and 2200 lb iron containing 3.20 per cent C; 1 per cent Si; 0.06 per cent S, and 0.05 to 0.06 per cent P.

° ° °

SUMMARY of the outstanding results of about 100 metallurgical research projects undertaken by industrial, university and government laboratories is contained in a report written by John Herrick now on sale by the Office of Technical Services, Department of Commerce, Washington 25, D. C. Major fields of investigation summarized in the report (PB-52353 "Metallurgical Research in World War II," mimeographed 50 cents) include foundry materials and processes, metals for high temperature service, aircraft materials, welding, armor, guns and gun steels, ammunition, examination of enemy materiel, properties of miscellaneous materials etc.

° ° °

REPORT on refractories in Germany mentions that a development in the procedure for rammed linings in induction furnaces which gave improved service was the incorporation of a wire mesh between successive layers of the rammed material. For high temperatures a nichrome wire mesh is recommended, and the lining is rammed into the furnace in such a manner that the sections of wire mesh are spaced about 5-cm (2-in.) intervals over the thickness of the lining. Function of the wire mesh is to prevent spalling, and it was said to do so admirably, for even though a tendency existed for the lining to spall, the wire mesh counteracts such a tendency and holds the lining together.



Oxygen generator installed in Milwaukee Steel Division, Grede Foundries Inc., Milwaukee, supplies oxygen for welding operations

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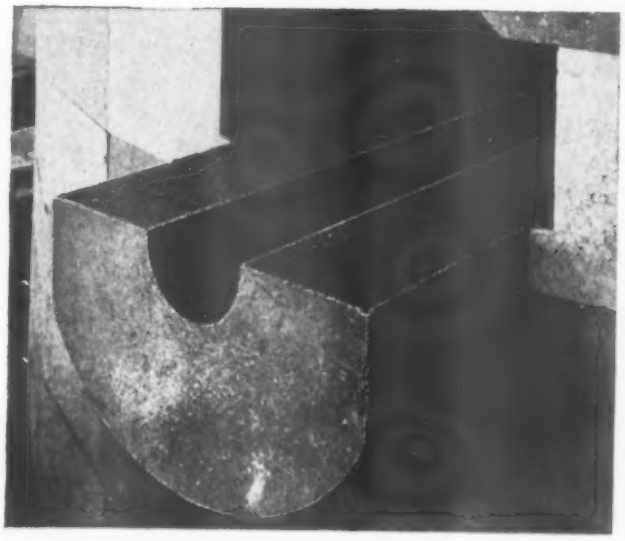

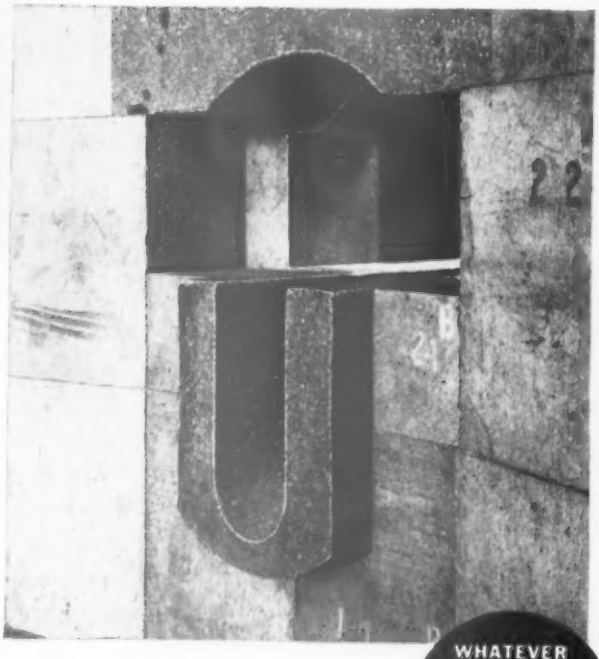

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THE FOUNDRY DATA SHEET

Navy Department Specification 46C11

COPPER-BERYLLIUM-ALLOY CASTINGS

A. Applicable specifications and other publications

A-1. Specifications.—The following specifications, of the issue in effect on date of invitation for bids, form a part of this specification:

Navy Department specifications:

General specifications for Inspection of Material, and Appendix II-Metals, Part A—Definitions and Tests.

Joint Army-Navy specifications:

JAN—P-105—Packaging and Packing for Overseas Shipment—Boxes, Wood, Cleated, Plywood.

JAN—P-106—Packaging and Packing for Overseas Shipment—Boxes, Wood, Nailed.

JAN—P-107—Packaging and Packing for Overseas Shipment—Boxes, Wood, Wire-Bound.

JAN—P-125—Packaging and Packing for Overseas Shipment—Barrier-Materials, Waterproof, Flexible.

A-2. Other publications.—The following Bureau of Supplies and Accounts publication of the issue in effect on date of invitation for bids, forms a part of this specification:

Navy Shipment Marking Handbook.

B. Grades

B-1 Copper-beryllium-alloy castings, covered by this specification, shall be of the following grade:

Grade A.

C. Material and Workmanship

C-1. Material—The material shall be such as to produce castings in full compliance with chemical and physical requirements of this specification.

TABLE I—Chemical Composition

Be	Fe Max.	Si Max.	Al Max.	Co	Cu
Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
1.50-2.00	0.25	0.30	0.10	0.15-0.30	Remainder

C-2 Workmanship.—The castings shall be of the plaster mold type, of uniform quality, smooth, clean and free from cold shuts, fins, laps, porosity, cracks or other injurious defects that may be detected by the Naval inspector or are revealed by manufacturing operations performed subsequent to acceptance. (see par. H-3).

D. Requirements Common to all Grades

D-1. See section E.

E. Requirements Applicable to Individual Grades

E-1. Chemical composition.—

E-1a. Copper-beryllium-alloy castings shall conform to the requirements shown in Table I.

E-1b. An analysis of each melt of castings shall be furnished by the contractor, showing the percentages of the elements designated.

E-2. Hardness.—Copper-beryllium-alloy castings shall conform to the following requirements:

Condition	Hardness
As cast	Rockwell B 80 max.
Heat treated	Rockwell B 90 min.

E-2a. Castings shall be furnished in the as cast condition, unless otherwise specified.

E-2b. Heat treatment shall consist of heating the as cast piece, without prior high-temperature solution treatment, at 750° ± 10° F. for 3 hours and cooling in air.

E-3. Dimensions.—The responsibility for furnishing castings which conform to the contours, finish and dimensions shown on the drawing within the specified tolerances, and that will conform to such gages as may be specified in individual cases, shall rest with the contractor. Sufficient stock shall be allowed for shrinkage and, where required, for finishing, but castings of excessive size or weight shall not be furnished.

E-4. Repairing of defects.—Casting shall not be repaired, plugged, or welded.

F. Methods of Sampling, Inspection, and Tests

F-1. Sampling

F-1a. Lot.—

F-1a(1). For purposes of sampling, a lot shall consist of castings from the same melt and in the same condition.

F-1a(2). Castings shall be properly separated by melts or lots when presented for inspection.

F-1b. Sampling procedure for inspection and tests.—

F-1b(1). Sampling for dimensional inspection and hardness test.—The number of castings dimensioned and/or gaged and tested for hardness shall be at the discretion of the inspector, but in no case shall less than one percent of the pieces in the lot or less than 5 castings be measured or tested for hardness.

F-1b(2). Sampling for chemical analysis.—From each lot, a sample for chemical analysis of not less than 5 ounces of drillings shall be taken from a representative casting of the lot which shall be selected by the Naval inspector. The drillings shall be taken from sound metal below the surface and shall be fine, clean, free from oil, dirt, grit, and foreign matter.

Navy Department Specification 46C11

COPPER-BERYLLIUM-ALLOY CASTINGS

F-2. Inspection and tests.—

F-2a. General.—Unless otherwise specified, inspection shall be made at the place of manufacture. All castings, unless otherwise specified, shall be visually inspected for defects and deficiencies.

F-2b. Dimensional.—Each sample casting selected in accordance with paragraph F-1b(1) shall be measured and/or gaged to determine conformance with the dimensions and tolerances shown on the drawings or blueprints.

F-2c. Hardness.—Each sample casting selected in accordance with paragraph F-1b (1) shall be tested for conformance with the requirements of paragraph E-2.

F-2d. Chemical analysis.—The sample obtained in accordance with paragraph F-1b(2) shall be forwarded to the Government laboratory designated by the bureau concerned for chemical analysis to determine conformance to the requirements specified in paragraph E-1.

G. Packaging and preparation for shipment

G-1. —Packaging.—Unless otherwise specified, castings shall be individually wrapped with not less than two thicknesses of 40-pound minimum basis weight kraft paper.

G-2. Packing.—

G-2a. For domestic shipment.—Castings, packaged as described in paragraph G-1 shall be packed in cleated plywood boxes, nailed wood boxes, or wire bound boxes conforming to the requirements of Joint Army-Navy Specifications JAN-P-105, JAN-P-106, and JAN-P-107, respectively. In cleated plywood boxes, water resistant plywood will not be required. The gross weight of boxes shall not exceed approximately 200 pounds.

G-2b. For overseas shipment.—Castings, packaged as described in paragraph G-1, shall be packed in cleated plywood boxes, nailed wood boxes, or wirebound boxes conforming to the requirements of Joint Army-Navy Specifications JAN-P-105, JAN-P-106, and JAN-P-107, respectively. Shipping containers shall be lined with a sealed water-proof bag, or its equivalent, made of material conforming to the requirements of Joint Army-Navy Specification JAN-P-125, for case liners. The seams and closures shall have water-resistance equal to that of the body material. The gross weight shall not exceed approximately 200 pounds. Shipping containers shall be strapped in conformance with the requirements of the appendix of the applicable box specification.

G-2c. For domestic and overseas shipment.—Where practicable, shipping containers shall be of uniform size, and shall contain the same number of items. Container shall be designed to fit the contents in a compact manner.

G-3. Marking.—In addition to any special marking required by the contract or order, each package and shipping container shall be marked in accordance with the requirements of the Navy Shipment Marking Handbook.

H. Notes

H-1. Intended use of the material.—Copper-beryllium-alloy castings furnished under this specification are intended for use where properties developed by heat treatment are necessary.

H-2. Ordering information.—Invitation for bids, and contracts or orders should cover the title, number, and date of this specification.

H-3. Invitations for bids and contracts or orders should contain the following provision:

> The contractor may be required to replace castings in which injurious defects are revealed by manufacturing operations performed subsequent to acceptance, without expense to the Government.

H-4. Copper-beryllium-alloy castings are capable of conforming to the following physical properties when annealed 6 hours at 1425° F., quenched in oil, and age hardened at the temperatures indicated in Table II.

TABLE II—Physical Properties

	Rockwell hardness	Ultimate tensile strength Psi	Elongation in 2 inches Per Cent
as quenched			
3 hours at	65 "B" scale	67,000	44
700° F.	35 "C" scale	155,000	2
750° F.	30 "C" scale	140,000	4
800° F.	25 "C" scale	125,000	7
850° F.	15 "C" scale	114,000	12
as cast[1]	76 "B" scale	78,000	29

[1] Without previous heat treatment.

H-5. Specifications and other publications—where obtainable.—Copies of Navy Department specifications, Joint Army-Navy specifications, and the Navy Shipment Marking Handbook may be obtained upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C., except that Naval activities should make application to the Supply Officer in Command, Naval Supply Depot, Bayonne, N. J. When requesting specifications, refer to both title and number (or symbol).

H-6. Patent notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Logan Roller Conveyor pouring lines in brass foundry, manufacturing plumbing fixtures and hardware. Molds move from molding machines in rear through pouring and cooling zones to shakeout in foreground. Lines are slanted sideways to speed up flow of metal into molds.

How many times do you "pick it up—and lay it down?" That's what costs money, as your product moves through successive stages of molding, pouring, cooling and machining. Reduce the number of times it is touched by human hands and you cut your costs . . . permanently.

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THIS HINES A
HAD TO B

THE DRAG
15" x 50" x 4"

HINES ALUMINUM DRAG FLASK . .	46 lbs.
BOTTOM BOARD .	32 lbs.
SAND	148 lbs.
Total Weight . .	226 lbs.

A LIFT OF 113 LBS. PER MAN

A flask this size does involve a substantial amount of sand and therefore must be sturdy and rigid enough to maintain its accuracy under the resulting heavy pressures. The Hines ALUMINUM "Pop-Off" Flask on this job met all requirements and still was handled easily by hand.

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S ALUMINUM "POP-OFF" FLASK

TO BE STRONG · STIFF · RUGGED

Note how easily this cope is handled by hand in the illustration above. Sand was the only weight factor here.

A LIFT OF 149 LBS. PER MAN

THE COPE
15" x 50" x 6"

HINES ALUMINUM COPE FLASK .	77 lbs.
SAND	221 lbs.
Total Weight . .	298 lbs.

IVE OR OVER TWENTY-FIVE YEARS

SF LASK CO.

CLEVELAND 11, OHIO

MAN-TO-MAN
on the Molder's Bench

"Know-how and Knack"

By RALPH L. LEE

IT'S been around seven years now since I built the little foundry out in the back yard. Before that, for some ten years or more, my foundry consisted of a wash boiler of molder's sand, some little handmade wood flasks and a little furnace. The furnace was also handmade out of an old garbage pail and vacuum cleaner Mother was about to throw away. Mother raised so much Ned about sand being dragged up from the basement that we had to put up a separate building.

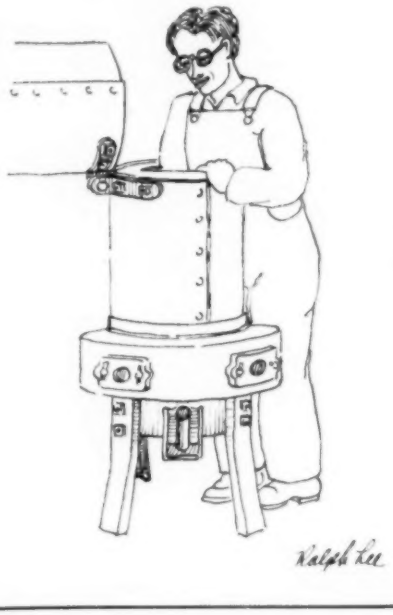
Now I feel quite proud of our setup. I just finished relining the cupola. I needed more melting capacity so I increased the inside diameter from 10 in. to 10½ in. I also put in a new tuyere system to increase the area, and have almost a continuous tuyere now. I made another change too—patching a 10-in. cupola is quite a chore. To do it I either had to lie on my back under the cupola and reach up inside with one arm, or stand on a stool and almost break my back reaching down. When underneath working up, I got pieces of coke, slag and clay in my eye, and working from the top down, I had one heck of a time reaching far enough.

So here's what I did, I cut the cupola in two at just about the top of the melting zone and hinged the upper part to the lower. Now I figure I'll be able to swing the upper part back far enough out of the road to get at my chipping and patching job. I hope. At least that's the way I figured it.

But just the same I've got my fingers crossed a bit, for I've learned from experience that things in this old foundry business don't always work out the way we figure they will, especially when you make a number of different changes at the same time.

As I go on trying to be a first-rate amateur foundryman it strikes me more and more that there's one whale of a lot of difference between knowing how molding is done and being able to do it. I don't believe I know anyone in the foundry business who does more reading on the subject than I do. My head is crammed full of dope on melting practices, sand, flasks, gating and risering, costing and different things like that. But even though I have in my head the figures and step-by-step directions, somehow or other they hardly ever work out the way they should on my first, second and even third try.

What I'm leading up to is that sometimes I think if I spent a little more time practicing what I already know is good and less time cramming my head full of the slick tricks others say they are pulling off, I'd get along a little faster.



As I grow older I'm getting more and more sold on the difference between theory and practice, or, to put it another way, the difference between know-how and knack. The more I see of successful foundries and foundrymen the more certain I am that the principal difference between them and those who aren't doing so good is *practice* — practice, more practice and still more practice. The sort of practice you've got to do to learn how to play the violin, golf or to speak a foreign language.

While I'd be the last person on earth to turn up my nose at book-learning in any form, I'm pretty well convinced that far too many people—and particularly the young ones—are putting too much stock in what they read, folks who haven't gotten it through their heads that booklearning will always remain theory until it's put into practice. Then there's another thing that strikes me—there simply isn't any short cut in practicing; it's doing something over and over again till the things you've learned become so much a part of you and so automatic you forget you've ever learned them—like walking, talking, driving a car or writing on the typewriter. As far as I can see this unromantic practice route applies to every department in the foundry business—even to selling.

I guess I'd better go out to the foundry now and put some of these pet theories of mine into practice; at least try to, anyway.

Aluminum Finishes

Reynolds Metals Co., Louisville 1, Ky., just has published a 2-volume treatise on "Finishes for Aluminum." Section one contains 108 pages devoted to a discussion of cleaning treatment, mechanical surface finishes, chemical surface finishes, electrolytic oxide treatments, electroplating, painting and ceramic coatings with a description of various controls and tests for finishes. Section two supplements that information with 120 pages of shop data on materials, equipment, preparation and procedure for the most widely used finishing processes. Copies of the two-volume work may be obtained at a cost of $2.

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- **TYPE OF SAND USED**
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ANNUAL MEETING OF AFA

Attracts Record Attendance at Detroit

(*Continued from page* 71)

society.

"We emphatically deny that we are foredoomed in the future to the boom-bust cycle of the past. Any thought that we can have a free economy which will never fluctuate, of course is nonsense. But we are convinced that this economy of ours can achieve a combination of progressively higher living standards, relative stability, and freedom of choice which will make it by far the most desirable type of economy in the world."

Joseph Sully, president, Sully Foundry Division, Neptune Meters Ltd., Toronto, and national director of the AFA, presided at the Canadian members' luncheon Wednesday, attended by approximately 175 members and guests. For several years this has been a regular feature where a large and representative group of foundrymen from the various Canadian provinces have foregathered for an hour of social intercourse. During the course of his remarks Mr. Sully announced that in addition to the Ontario and Eastern Canada and New Foundland Chapters of the AFA, the Dominion now has a third chapter recently organized in Vancouver, British Columbia.

Prominent Foundrymen Present

The meeting was graced with the presence of Sheldon V. Wood, and William W. Maloney, national president and secretary-treasurer, respectively. Other members at the speakers' table included J. Wotherspoon, chairman of the Ontario Chapter; E. N. Delahunt, general superintendent Warden-King Co., Montreal, and newly elected national director; Alex G Storie, president, Fittings Ltd., Oshawa, Ont., past director, AFA; Harold J. Roast, recently retired vice president, Canadian Bronze Co., Montreal, past director and honorary life member, AFA; J. Dalby, vice chairman of the Ontario Chapter and general chairman of the recent Canadian foundry conference in Toronto; Henry Louette, chairman, Eastern Canada and Newfoundland Chapter, Montreal.

Although the convention officially closed Thursday evening, approximately 650 visitors took advantage of the "Ford Day" inspection trip on Friday to visit the Ford Motor Co.'s River Rouge plant at Dearborn. Chartered buses took the group to the Ford plant, and a company guide assigned to each bus escorted the men through the foundry and a final assembly line. Near the end of the foundry trip an assortment of patterns, cores, molds and castings was interestingly displayed. At the conclusion of the tour the visitors were guests of the Ford company at a luncheon served at nearby Dearborn Inn.

Hundreds of convention visitors participated in other inspection trips during the week to various Detroit district foundries, one of the most popular drawing cards being the new Cadillac gray iron foundry.

FOUNDRY COSTS

Given Consideration

A GROUP of approximately 200 attended the foundry cost session, sponsored by the Foundry Cost Committee, Thursday afternoon. R. L. Lee, Grede Foundries Inc., Milwaukee, presided, with George Tisdale, Zenith Foundry Co. Milwaukee, acting as co-chairman.

In a paper entitled "Two Ways to Make Profit," Wally E. George, of Booz, Allen & Hamilton, Chicago, compared the method of making money in business by buying as cheaply as possible and selling at prices as high as the traffic will bear, with the better way of planning costs in advance, setting up a cost system and adhering to sound cost control. With the use of slides, Mr. George demonstrated the essential components of the profit formula, the objectives of a foundry cost accounting plan, a standard chart of accounts, production estimate summary by days, covering cost of each operation, a break-even chart showing cost and selling price per ton, and a profit-graph showing monthly costs, sales and profits of tonnage per month.

In the discussion after the talk the subject of scrap control was mentioned and it was suggested that scrap costs may be so great as to require a full-time assistant superintendent assigned to the problem who will more than pay his own salary in savings effected. It was brought out that foundry costs must be broken down and computed by departments, against each job, including cost of core material, cutting and welding, cleaning room, etc.

C. E. Westover, Westover Engineers, Milwaukee, in his discussion of "Foundry Costs and Cost Controls," stressed the fact that foundry cost control is always important, but has greater significance as the end of the non-competitive era of war production approaches. Both accounting and cost control are necessary and should be co-ordinated. By means of cost control, costs can be predetermined and reduced. The break-even point can be determined and serves as a guide to profit and loss. Wage incentives and a sound wage structure are necessary to a good program of cost control.

In the discussion following the talk it was brought out that production of hourly workers is about 60 per cent of that of incentive workers, but the same standard for measure of work is used for both. It was also determined that about 60 per cent, or the break-even point, of capacity, should be used for establishing burden computations. Operating foundries below the break-even point was condemned and the practice of taking any job below cost is not justified.

A. E. Hageboeck, president, Frank Foundries Corp., Moline, Ill., and chairman of the cost committee, Gray Iron Founders' Society, entered into the discussion of preparation of foundry costs, breaking even on estimates, burden absorption, and measurement of capacity variance, giving figures arrived at by the society's cost committee. It was agreed that the greatest variable in foundry cost is the labor item.

PATTERNMAKERS

Hear Two Papers

A SESSION Tuesday afternoon devoted to patternmaking had V. J. Sedlon, Master Pattern Co., Cleveland, presiding, assisted by A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, as co-chairman. About 100 attended the meeting.

W. G. Schuller, Caterpillar Tractor Co., Peoria, Ill., in a talk entitled "Pattern Purchase Considerations," stated that considerable thought should be given to the making and purchase of good pattern equipment since it can be a significant factor in the control and reduction of foundry costs. He stated the purchase of patterns for another foundry requiries a knowledge of its production facilities and techniques. In this case, the assistance of a pattern engineer is valuable.

(*Continued on page* 130)

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FIGURES FROM BUREAU OF MINES
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(Moisture Free)

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Volatile Matter (V C M)	38.9%
Fixed Carbon	57.4%
Ash	3.7%
	100.0%

ULTIMATE ANALYSIS

Hydrogen	5.4%
Carbon	82.0%
Nitrogen	1.6%
Oxygen	6.6%
Sulphur	.7%
Ash	3.7%
	100.0%

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(*Continued from page* 128)

The speaker said that low first cost of pattern equipment is generally poor economy because maintenance costs may be high, casting quality may suffer and production may be low. Whether patterns should be interchangeable or whether duplicate equipment should be provided depends on the number of changes to be made and the flexibility desired. In the discussion period which followed it was emphasized that pattern engineers should be selected from the pattern shop and should have experience in the foundry and coreroom as well.

Plastic patterns were considered in a talk by C. R. Simmons, Durez Plastics & Chemicals Inc., North Tonawanda, N. Y., entitled "Liquid Phenolic Casting Resins for Foundry Patterns." The speaker stated that synthetic plastic materials are finding increasing application in the production of patterns and coreboxes. Capable of being cast, like some other materials used in pattern and matchplate construction, certain plastics provide the patternmaker with a pattern easily cleaned and finished. Cast resins machine like hard maple and woodworking tools may be used.

Advantages to the foundryman include rapid duplication of patterns which are wear-resistant and may be drawn readily from sand. Mr. Simmons used slides to show application of the resins to practical foundry use and demonstrated the hardening qualities of the material by combining an acid to accelerate setting time so that the group could see actual use of the material.

Patternmakers held a round-table luncheon Thursday noon at which H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind., and L. F. Tucker, City Pattern & Foundry Co. Inc., South Bend, Ind., presided. Discussion leader was A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, and he pointed out that since the finished castings are dependent upon the quality of the pattern, it is advisable to maintain close relationship between foundryman and patternmaker. Also in the pattern shop the foreman and superintendents should keep in close touch with the men by visiting each one every day. He also gave some highlights on apprentice training as practiced by his firm.

In a later discussion on aluminum alloy core driers it was pointed out that it is advisable to stress-relieve them by a heat treatment cycle previous to use. Some use a single cycle of raising to 400 F for 2 or 3 hr and cooling, while one speaker said that his firm performed that operation three times to insure stability of the driers.

ALUMINUM AND MAGNESIUM

Subjects Cover Wide Range

WIDE range of subjects was covered in three technical sessions and a round-table luncheon devoted to discussions of aluminum and magnesium foundry practice. Opening meeting Monday morning was under the direction of Walter E. Sicha, Aluminum Co. of America, Cleveland, and James C. DeHaven, Battelle Memorial Institute, Columbus, O. First paper on "Influence of Inclusions on Properties of Sand Cast Aluminum Base Alloys," by A. W. Dana, L. J. Ebert and George Sachs, all of Case Institute of Technology, Cleveland, was presented by Mr. Ebert. This paper comprised a study of six pairs of alloys. Each pair consisted of one composition containing the maximum amount of minor constituents while the other contained the usual amount found in commercial ingot. Alloys were melted and poured into test bars under controlled commercial conditions.

Alloys included the 108 type containing about 4.3 per cent Cu and 3.1 per cent Si; 43 type containing 5 per cent Si; 195 type containing 4.3 per cent Cu and 1.1 per cent Si; 355 type containing 1.4 per cent Cu and 5.1 per cent Si; 142 type containing 4 per cent Cu, 1.6 per cent Mg and 2 per cent Ni, and one containing 7.4 per cent Cu, 2 per cent Si and 1 per cent Zn. The study indicated that the 43 type alloy had the least tendency to form inclusions, with the 108 type second. The 142 type had the greatest tendency to form inclusions. It also was found that inclusions which intersected the surface reduced tensile strength more than those contained wholly within the casting. Yield strength was not affected by the inclusions.

In the discussion a question was asked whether there was sufficient difference in specific gravity Al and Al_2O_3 to permit separation. Chairman Sicha stated that Al_2O_3 definitely is heavier than Al, but the former usually contains gas which causes it to float in the molten Al. David Basch, Almin Ltd., Schenectady, N. Y., inquired how the authors determined that the inclusions mainly were Al_2O_3, and was informed that it was by appearance under the microscope. Hiram Brown, Solar Aircraft Co., Des Moines, Iowa, inquired as to the color of Al_2O_3 inclusions, and the statement was made that it is a darker gray than Al under the microscope, and with alloys containing Mg the color is black after heat treatment. Wayne Martin, Beryllium Corp., Reading, Pa., stated that some investigations he made agreed with the authors' study in that yield strength is not affected by inclusions. Walter Bonsack, National Smelting Co., Cleveland, asked whether some of the surface defects might not have been due to turbulence of the metal or to sand conditions. It was replied that no check was made on those or of the possibility of Mg reaction with the sand.

Second paper on "Some Causes of Pinholes in Magnesium Alloy Castings," by H. H. Fairfield, H. W. Dietert Co., Detroit, and A. E. Murton, Bureau of Mines, Ottawa, Canada, was presented by Mr. Fairfield. In the investigation flat plates ½ x 5 x 10 in. were used, since they are most productive of pinholing. It was found that major causes included high mold-gas pressure, slow pouring rate, careless melting practice, use of old molding sand, and presence of clay balls in the sand. In the discussion L. W. Eastwood, Battelle Memorial Institute, Columbus, O., pointed out that gas in solution in the melt gives rise to clusters of pinholes while local reaction gives a single hole known as a green sand blow, and that causes of the former are better understood than the latter.

Venting is Important

C. E. Nelson, Dow Chemical Co., Midland, Mich., said he agreed with the authors that venting the molds is important, and that he had found that impurities in the molding sand, such as soot or seacoal, increased pinholing. Also that the permeability of the sand decreases with use. J. E. Linsey, Light Alloys, Canada, inquired whether use of a skim gate would prevent pinholing, and was informed that it had little influence. He also asked whether the pinholes appeared in the cope or the drag. Mr. Eastwood said that hydrogen in the metal usually resulted in pinholes in the cope while green sand blows occurred in either the cope and on the vertical walls.

Second session was held Monday afternoon with R. E. Ward, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., and W. Mader, Oberdorfer Foundries, Syracuse, N. Y., presiding. R. A. Quadt, American Smelting & Refining Co., Barber, N. J., discussed "Effect of Room Temperature Intervals Between Quenching and Aging of Aluminum Sand Casting Alloys," and pointed out that an interval of one day at room temperature between quenching and aging of aluminum alloys containing magnesium (Si 7 per cent and Mg 0.3 per cent, and Cu 1 per cent, Si 5 per cent and Mg 0.5 per cent) has a pronounced effect on physical properties, resulting in increased elongation without too great a decrease in tensile and yield strengths. Such an interval had no ef-

(*Continued on page* 133)

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Here is a new improved liquid parting second to none! A war-time development perfected in our research laboratories and thoroughly tested in foundry operations . . . a distinctive non-inflammable product which cleans and seals with a maximum of effectiveness. Smith L-O Liquid Parting embodies fast acting, powerful solvents, a special graphite, and high melting point waxes which cleanse and prepare pattern surfaces permitting many draws between applications.

It is especially efficient for patterns on sand slinger operations, and in many instances, foundrymen use the deposit of graphite as a facing to give a stove plate finish to castings. You are sure to get the utmost satisfaction from this time-saving, work-saving parting because it can appreciably reduce costs and increase production. Once you have tried it, you will agree it is all we claim it to be. Free samples of this economical solution are ready for shipment to you. Send for yours today!

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CORE OIL CORE WASH ROD DIP

SMITH OIL & REFINING CO.
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

(*Continued from page* 130)

fect on the 4 per cent copper 96 per cent aluminum alloy.

Second paper, presented by E. V. Blackmun, Aluminum Co. of America, Cleveland, described methods, equipment and materials employed in impregnating aluminum and magnesium alloys to eliminate fine leakage or seepage. Commonest material is sodium silicate with an SiO_2 to Na_2O ratio of 3.5 to 1. Other materials include tung oil, synthetic varnishes of the glycerol phthalate or phenol formaldehyde types, styrene resin solutions and drying oil-resin solutions. The speaker described the various methods of immersion, application of pressure, and use of vacuum and pressure to inject the materials.

Third technical session was held Tuesday morning under chairman R. T. Wood, American Magnesium Corp., Cleveland, and Hiram Brown, Solar Aircraft Corp., Des Moines, Iowa. In discussing "Simplification of Light Metal Casting Design and Its Effect Upon Serviceability," W. T. Bean Jr., Continental Aviation & Engineering Corp., Detroit, stated that complexity of design tends to result in low load carrying ability of the part or structure, since it is difficult to make a stress analysis. Simplification of design, according to the speaker, led to better castability, and to indicate practical application Mr. Bean showed numerous slides picturing castings with improved load carrying ability accomplished by design changes such as increased filletting, use of shallow broad ribs, providing more uniform sections, etc.

Use New Type Skim Gate

Second paper on "New Gating Technique for Magnesium Alloy Castings," by H. E. Elliott and J. G. Mezoff, Dow Chemical Co., Midland, Mich., was presented by Mr. Elliott and described the use of a cylinder of tinned, perforated steel such as used for skim gates. The cylinder is located close to the casting cavity and connected to a vertical section by a slot gate. A small amount of steel wool on the order of a wick is placed in the tube or cylinder to direct the molten metal stream to the bottom. Perforated section along the slot filters out any oxide, and the whole arrangement permits filling the casting cavity uniformly from the bottom upward.

In the discussion L. W. Eastwood, Battelle Memorial Institute, Columbus, O., directed attention to the fact that in bottom pouring it is necessary to provide a complete reversal of direction of the metal stream to prevent striation or hot spot flow, and when that procedure is followed good results are obtained. R. E. Ward, Bendix Aviation Corp., Teterboro, N. J., asked if there was any relationship between slot and tube diameter, and was informed that as yet it had not been established, and would have to be worked out for various castings. Manley Brooks, Dow Chemical Co., Midland, Mich., stated that considerable difficulty had been encountered in developing the gating procedure, and more experience will be required before standards can be set up. Walter Sicha, Aluminum Co. of America, Cleveland, inquired as to the advantages of top pouring over bottom pouring of castings. The reply was that the former permitted economy and moldability.

Closing meeting of the Aluminum and Magnesium Division was the round-table luncheon held Tuesday noon. Walter Bonsack, National Smelting Co., Cleveland, and C. E. Nelson, Dow Chemical Co., Midland, Mich., were chairmen with A. T. Ruppe, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., as discussion leader. Subject was "Recommended Practices for Aluminum and Magnesium," and Mr. Ruppe called on Manley Brooks for presentation of that part of the report dealing with magnesium. He said a number of changes and additions had been made to the report previously prepared, and these related to additional protective agents and cores sands. One was potassium fluoborate which was added in the amount of 0.5 per cent with the usual boric acid and sulphur. Data was included on use of chlorine during melting to mitigate tendency toward microporosity, as well as on procedures for grain refinement involving superheating and use of carbonaceous materials.

Hiram Brown, Solar Aircraft Corp., Des Moines, Iowa, presented the section dealing with aluminum and said the changes mainly were concerned with changes in nomenclature and the designation of the various alloys by recognized commercial numbers with suitable cross indexing on society standard specifications so that any alloy can be located if one of the designations is known.

BRASS, BRONZE DIVISION

Sponsors Three Meetings

TWO technical sessions and a round-table luncheon meeting were conducted during the convention by the Brass and Bronze Division. Three papers were presented at the opening session, Tuesday morning, presided over by H. M. St. John, Crane Co., Chicago, with A. K. Higgins, Allis-Chalmers Mfg. Co., Milwaukee, as co-chairman.

The first of these papers, "Radiography of Gun Metal Castings," was presented by W. H. Baer, nonferrous section, Naval Research Laboratory, Washington. Purpose of the paper was to identify various typical defects in gun metal by means of radiographs. The test is intended as a supplement to pressure testing of bronze castings which is said to give no information about metal below the thin skin of the casting. Mr. Baer believes that a knowledge of the cause of leakage in some castings and knowledge of metal structure behind the skin is important if foundrymen are to make appropriate changes in melting, molding or casting practice.

Tests were made on more than 100 gun metal plates, 1 x 6 x 8 in., of nominal composition 88 per cent copper, 8 per cent tin and 4 per cent zinc. Artificially produced defects included distributed shrinkage, hot tears, sand and slag inclusions and gas porosity. The investigation was confined to correlation of defects with foundry practice.

Results of the shrinkage study show that the extent and type of shrinkage depends on gating, risering and chilling of the casting. Characteristic differences were observed between gas porosity and distributed shrinkage. Gas porosity tends to be evenly distributed and causes a hazy, indefinite appearance. Distributed shrinkage, although spread over the central region of the plate, still has limits beyond which it does not occur to any great extent. Defects such as gas porosity, shrinkage, blowholes, tears and dross often are hard to recognize because they may not occur alone or in great quantity.

Discussion in the audience indicated that the radiographic method does not reveal all defects; those under a certain size are not shown at all.

W. W. Edens, Ampco Metal Inc., Milwaukee, read the second paper, "Segregation of Manganese Bronze," which was prepared by G. E. Dalbey, Mare Island Naval Shipyard, Vallejo, Calif. This paper presented results of a study of manganese bronze melts which under some conditions were found to contain a sludge consisting of iron, silicon, aluminum and manganese. With the aid of slides, Mr. Edens described the test procedure used.

Results of the study show that small amounts of impurities in manganese bronze may result in iron, silicon, aluminum and manganese concentrate in the sludge, which has a tendency to float close to the top of the molten metal. The amount of sludge formed increases as the silicon content increases and is noticeable with silicon contents in excess of 0.1 per cent.

Sludge formation increases as the metal cools from furnace temperature to pouring temperature; also sludge in the metal will cause thin castings to misrun. Furthermore, there is a tendency for the elonga-

tion to decrease as silicon increases, and finally, the higher the iron content of the charge the more it will concentrate in the sludge with a given silicon content.

In a prepared discussion of the paper, G. P. Halliwell, H. Kramer & Co., Chicago, pointed out that segregation of hard spots in manganese bronze is not characteristic of that alloy, but is the result of faulty metallurgical practice either when the alloy is first made or later melted. He added that it is a natural metallurgical phenomenon that if any of the iron and manganese becomes oxidized, it combines with the nearest silica to form a slag. Mr. Halliwell is of the opinion that if the authors of the paper had used the aluminum oxide and broadcloth technique instead of the electrolytic etch, they would have obtained better results in their study.

The third paper, "Spectrographic Analysis in the Manufacture of Brass and Bronze Ingots," prepared by G. E. Staahl and G. P. Halliwell, H. Kramer & Co., Chicago, was presented by Mr. Halliwell.

He stated that the purpose of the study was to indicate controls in manufacture of ingot used by foundrymen. The theory of spectrographic analysis is based on the fact that when atoms are activated they emit light of various wave lengths. The bands of light are allowed to fall on the spectrographic plate, and the density of the waves determines the type of metal being studied. The process which has been applied to copper-base alloys only recently, is a comparative one—the density of a line of the spectrograph of the sample being compared with that of a known alloy.

Applications of the method have been in the control of large, open-hearth furnaces using as much as 120 lb of metal, in ascertaining tin, aluminum, zinc, lead and minor element content, as a qualitative measure for chemical laboratories and sorting of certain metals. The method is faster than the wet analysis method, requiring only 15 to 20 minutes.

To obtain a sample, metal is drawn into a ¼-in. pyrex tube by means of a plunger. When the metal has solidified the glass is broken to obtain the test pin. Chemical analysis of these pins indicates very little variation in the metal along the length of the pin. It has been found that grain size and pouring temperature have no effect on test results. The method has been successfully applied to 85-5-5-5, 80-10-10, manganese and aluminum bronze alloys.

During the discussion period W. W. Edens, Ampco Metal Inc., Milwaukee, said that he had used a bar type test bar poured in an iron split mold with results not as good as those obtained with test pins.

Herman Smith, Federated Metals Division, American Smelting & Refining Co., Pittsburgh, presented a paper entitled "Melting of Brass and Bronze" at the Tuesday noon luncheon meeting. Presiding at the session was B. A. Miller, Baldwin Locomotive Works, Philadelphia, assisted by R. J. Keeley, Ajax Metal Co., Philadelphia.

FOUNDRY WEEK: James L. Mahon (right), American Car & Foundry Co., Detroit, receives from Mayor Edward J. Jeffries Jr. of Detroit a proclamation making the week of April 28 "Foundry Week" in an official tribute to those attending the AFA convention. In the group, left to right, are W. W. Maloney, AFA secretary-treasurer; F. J. Walls, International Nickel Co., immediate past president of the association, and A. H. Allen, THE FOUNDRY, Detroit Chapter chairman

Mr. Smith stated that although brass and bronze are usually thought of as alloys of copper, tin, lead and zinc, it must be considered that hydrogen, carbon, oxygen and phosphorus are also alloys in these metals. The first four are added at alloying times, the next three enter the melt from the gaseous atmosphere of the furnace, and phosphorus is supplied in the phosphorus copper which is added to take out residual oxygen. When the metal changes to a solid the gases combine to form gaseous compounds and porosity.

He went on to say that in thinking in terms of porosity, the volume and not the weight of gaseous inclusions is important. No furnace atmosphere in actual practice produces enough hydrogen to cause excessive porosity. Oxygen must be present with the hydrogen to result in porosity which is caused by water vapor formed by high initial hydrogen content in the initial melt and developed as the oxygen content increases. Recommendations for melting procedures for different alloys were made.

Study Change In Properties

During the Tuesday afternoon brass and bronze session two papers were presented. G. P. Halliwell, H. Kramer & Co., Chicago, presided, and B. M. Loring, Naval Research Laboratory, Washington, was co-chairman.

The first paper, "Correlation of Structure and Properties 85-5-5-5 Alloy Test Bars," prepared by J. G. Kura and L. W. Eastwood, Battelle Memorial Institute, Columbus, O., was presented by Mr. Eastwood. Purpose of this study was to attempt to find out why changes in properties occur. Technique used was that of microradiography. Tests were made on 0.005-in. thick sections representative of the piece to be tested.

Comparisons were made between horizontal web Webbert, modified web Webbert, LTB and keel block test bars. Slides of microradiographs were shown to illustrate the different structures obtained. It was pointed out that as pouring temperature decreases elongation decreases and the lead pattern becomes angular.

A discussion prepared by A. J. Smith and read by S. A. Weigand, both of Lunkenheimer Co., Cincinnati, set forth the opinion that pouring temperatures can be compared on bars of similar design only. The discussion period also brought out the opinion that angular dendrites in brass and bronze alloys form angular lead particles because lead solidifies last as the alloy freezes. Also, it was suggested that the keel block test bar gives a better picture of the characteristics of large castings and a better indication of pressure-

(*Continued on page* 136)

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(*Continued from page* 134)
tight castings.

"Gas Absorption Phenomena and Degasification of Cast Monel," by B. N. Ames and N. A. Kahn, New York Naval Shipyard, New York, was the title of the concluding paper, given by Mr. Ames.

This paper described the study of the effects of various deoxidation treatments of cast nickel-copper alloys melted in the indirect and resistor furnaces. All test work was done with production equipment at near production capacities. Carbon monoxide or carbon-oxide reactions were not considered factors in causing defective porosity areas in cast monel.

Results of the study indicate that ionization of a furnace atmosphere during melting in the indirect arc furnace can materially accelerate the amount of gas absorbed and subsequently rejected during solidification. Magnesium is not effective as a degasser in indirect arc furnace practice. Titanium, lithium and zirconium will eliminate nitrogen porosity in cast monel by the formation of stable nitrides. Titanium suppresses hydrogen porosity. The keel block test bar is a more sensitive indicator of metal quality than the regular test bar.

SAND TESTING METHODS

Discussed in Several Papers

FIRST of three technical sessions sponsored by the Sand Division was held Tuesday afternoon with E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland, presiding over the group of about 200 who attended, and Howard J. Williams, New Jersey Silica Sand Co., Millville, N. J., acting as co-chairman.

In a talk entitled "Elevated Temperature Properties of Steel Foundry Sands," D. C. Williams, Cornell University, Ithaca, N. Y., gave findings of three quarterly reports given to the Committee on Steel Foundry Sands. Data was taken from 100 tests conducted at the university by the committee, using the same mixture in each case. Mr. Williams used slides showing "Hot Compressive Strength vs Temperature of Sand Mixtures," "Method of Mounting Thermocouples for Temperatures Determined in Specimens in Furnace and Dilatometer," "Temperature at Center and Surface of Green 1⅛" x 2" Test Specimens During Shock Heating in Research Furnace," and "Exposure Time for Center and Surface of Test Specimen To Reach Constant Temperature During Shock Heating." The last named was a comparison of research furnace and dilatometer, 1944 model.

Franklin P. Goettman, research manager, George F. Pettinos Inc., Philadelphia, in a talk entitled "Preparation of Foundry Sands for Market," classified foundry sands as bonded, semibonded and washed. Only sands possessing the proper qualities, such as grain size, refractoriness, bond, permeability and durability, are usable, so that every deposit is not suitable. Mr. Goettman described, with the use of slides, how deposits should be mapped and prospected before development to provide a basis for planning a flexible mining and processing method. The importance of processing, field supervision and laboratory control was stressed. Typical deposits of each of the three classifications were discussed and emphasis was placed on thorough removal of overburden, control of feed and adjustment of classifiers.

Report of the AFA Subcommittee on Physical Properties of Iron Foundry Sands at Elevated Temperatures, was given by H. W. Dietert, H. W. Dietert Co., Detroit. In his talk, entitled "Evaluation of Core Knockout," Mr. Dietert described the work of the committee which completed a series of foundry and laboratory tests at University of Michigan foundry, to study the relationship between the behavior of cores during shakeout and known laboratory tests made at elevated temperatures. The first correlation completed showed the relationship between time required to knock out a core from a hollow test casting and the retained compressive strength under own atmosphere test conditions of a core test specimen. Correlation between hot compressive strength and core knockout time was also found.

A pleasant human interest touch marked the opening of the second sand session Wednesday morning when the chairman announced that the date marked the birthday anniversary of Dr. H. Ries, Cornell University, the originator and dean of the sand testing fraternity. The audience happily and enthusiastically sang "Happy Birthday To You!" Although highly appreciated, the spontaneous tribute of admiration apparently had no adverse effect on the genial sand man's permeability, green or dry strength, bond, physical properties and moisture content, with the possible exception of a slight increase in the vicinity of the eyes.

At this meeting under the joint chairmanship of G. R. Gardner, Aluminum Co. of America, and K. J. Jacobson, Griffin Wheel Co., Chicago, three papers dealing with sand testing were presented. A committee report on "New Tentative Standards for Grading and Fineness of Sands" was presented by R. E. Morey, Naval Research Laboratory, Washington. "The Foundry Sand Laboratory," was described by O. J. Myers, Werner G. Smith Co., Minneapolis. A joint paper, "A Study of the Precision of Sand Test Data," prepared by R. E. Morey and C. G. Ackerlind, Naval Research Laboratory, was presented by Mr. Morey.

In the first paper the author pointed out that accurate methods of measuring fineness and of grading mold materials are becoming increasingly important because of the trend toward finer molding materials. Fineness may be determined for particles too small to be screened by a hydrometer. Under readily standardized conditions the operation is simple and rapid. The hydrometer test data combined with the information obtained by sieving the coarser material give complete information on particle size distribution. In this way size distribution for particles from less than one micron to the coarsest material normally considered as a part of molding sand, may be measured. Plotted on semi-log paper, these data form a smooth curve which permits exact comparisons among mold materials. A cumulative curve also may be drawn from data obtained using screens alone. In either case, size distribution can be determined by inspection. An index to grain distribution can be found by simple calculation.

Describes Laboratory Functions

Following a brief reference to the place of a sand laboratory in a plant, O. J. Myers stated that at least 11 significant points are to be considered: To control the uniformity of the product, control of manufacturing process, to improve products and practices, to control expendable molding materials, to investigate new materials, to aid management in solving certain production problems, to perform engineering calculations relating to foundry practice, to maintain records of past performance, to correlate data, to perform routine analysis, to aid organization prestige and provide psychological control. The report concludes with a tentative list of the apparatus and equipment required and the proper location of each item in the laboratory.

In the third paper the authors described how the reproducibility or precision of tests used in the evaluation of foundry molding sands was examined by statistical methods. Shewart's method for relatively small samples was found particularly suitable for this purpose. Variations in test values were found due to technique and to different operators. Similar equipment in different laboratories gave different results. The assurance that apparent differences in test results represent actual differences in the sand is increased when the testing technique is standardized and the errors of sampling

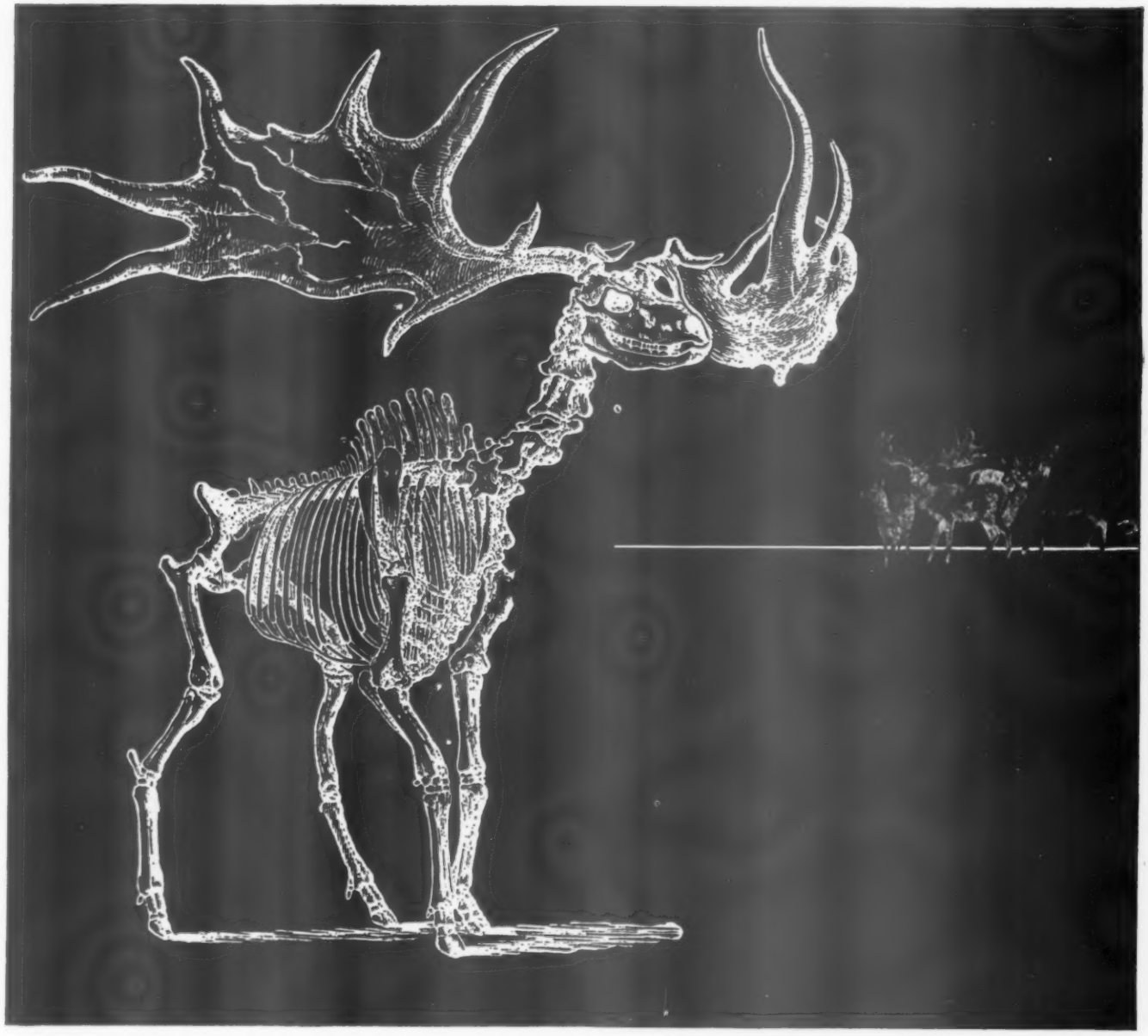
(*Continued on page* 139)

THE ELK THAT ALSO RAN

Once upon a time an enormous elk with out-size antlers roamed the Irish forests. He was impressive but impractical; concentration of weight in the wrong place ruined his ability to meet competition.

The same thing can happen in modern machinery. Too much weight, especially in cast steel parts subject to rapid operation, can reduce efficiency considerably. The machine may not become extinct, but it won't make many friends.

There is a simple, economical way of avoiding such troubles—specifying molybdenum cast steels. Their hardenability permits weight reduction with no sacrifice in ability to meet service requirements. Practical data on request.



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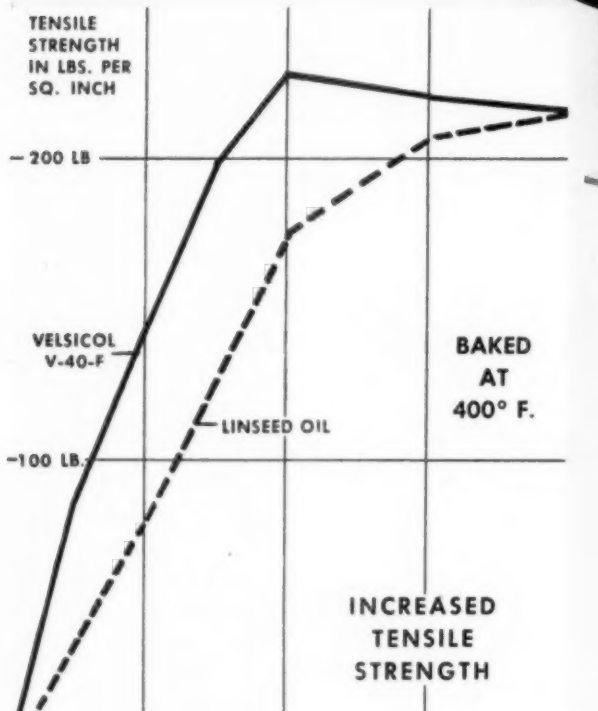

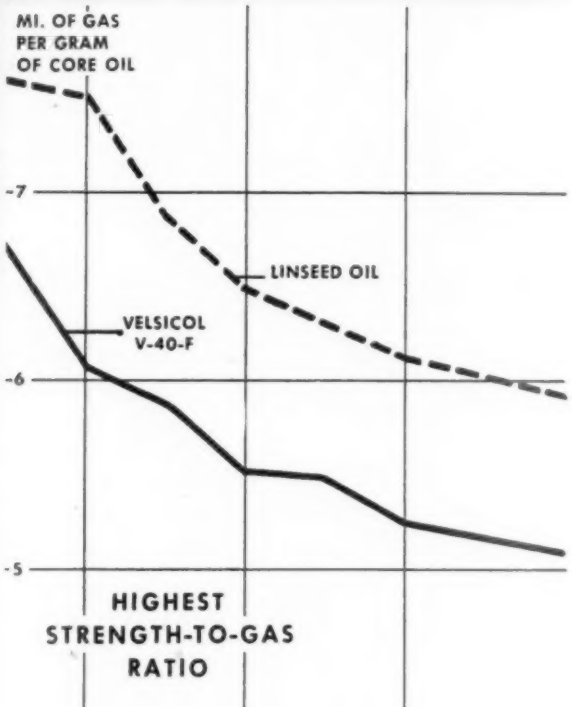

These curves show the comparison in tensile strengths and baking speeds of Velsicol V-40F Coresin Core Oil and raw linseed oil at a baking temperature of 400°F. The sand mix is 50 mesh washed and dried rounded grain silica sand with 1% by weight of core oil and 2% moisture.

The curves were obtained using 50 mesh washed and dried silica testing sand with 1% oil and 2% moisture. Test cores were baked in a recirculating type laboratory oven and they developed comparable tensile strengths with each oil. Test specimens burned in their own atmosphere for 1 min. at 1900°.

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and testing are reduced to a practical minimum.

At the concluding session held Thursday afternoon under the joint chairmanship of Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., and Bradley H. Booth, Carpenter Bros. Inc., Milwaukee, Harry W. Dietert presented a paper on "Density of Molding Sands" prepared in collaboration with H. H. Fairfield and E. J. Hasty, H. W. Dietert Co., Detroit.

The authors studied the effect of sand density on metal solidification, effect of moisture and other variables on sand density, and effect of ramming method on sand density. Results indicated that density of molding sand, whether controlled by degree of ramming or by choice of ingredients, exerts sufficient influence on rate of gray iron solidification to make it of practical importance since as the sand density increases the rate of solidification increases. Density of sand increases with mold hardness and with moisture content. Bentonite bonded sand has a lower density than fire clay bonded sand. Increase of clay content increases density. Coarse sand has a slightly higher density than fine sand, and sand with a wide spread in grain size will have higher density than a sand with all grains of equal size.

Compare Ramming Methods

Butt, jolt and squeezing methods of ramming are less affected by moisture content than blow ramming. Jolt ramming is less affected by change in clay content than butt or squeeze ramming and density of sand rammed by those methods increases with clay content. Decrease in grain size decreases density when rammed by butt, jolt, squeeze and blow methods. Addition of seacoal, dextrine and cereal binders to clay-bonded sand causes a reduction in density when butt rammed or jolted. Density of blown sand is decreased by each material added to the base mixture.

Second paper by G. R. Gardner, Aluminum Co. of America, Cleveland, dealt with "Physical Properties of Molding Sands," and described an investigation to correlate laboratory tests with those at the mold side. The author determined the deformation, green tensile strength, surface hardness, permeability, green compressive strength, and apparent density of two sands and found that the effect of moisture changes and ramming on these properties conformed to the same general pattern for both. Graphs on the various physical properties are prepared from the data, and in operation the procedure is to make a moisture determination on the sand just prior to making the mold and also a surface hardness determination at any desired location on the mold. The point of intersection on the hardness graph of the values so determined defines a reference point which, when applied to graphs of other properties, will provide an estimate of permeability or any other property previously surveyed at the location of the mold under examination.

EDUCATIONAL ACTIVITIES

Discussed By New Division

TWO SESSIONS, in addition to a business meeting, were held during the convention by the Educational Division, which was organized last fall to consolidate various educational activities of the association. The first meeting Monday was presided over by Frank C. Cech, Cleveland Trade School, Cleveland, with Ben D. Claffey, General Malleable Corp., Waukesha, Wis., as co-chairman. Three papers were presented, the first being "Management's View of Apprentice Training," by R. S. Falk, the Falk Corp., Milwaukee

Mr. Falk explained how apprentice training was disrupted during the war by the inadequate supply of young men, and also by the necessity for rapid training of new workers. During the current postwar activities there also has been a need for intensified training, but he urged that apprentice training be regarded as a long-term proposition and not be adjusted too closely to sales volume alone. He recommended that industry be more selective in the type of individuals it accepts for apprentice training.

A committee report on "Foundry Training Course for College Graduates" was presented by A. W. Gregg, Whiting Corp., Harvey, Ill. He explained that the course which his committee prepared is a general one and must be adapted to suit the particular foundry in which it is applied. The report recommends various periods of time which are to be spent in different departments of the plant. Written reports are to be submitted by trainees at regular intervals. The committee urged that one or more individuals be given responsibility for the training program and that weekly meetings to check progress be held with the trainees. The committee emphasized the need for adopting a definite training course, such as the one outlined, when young engineering graduates are hired, if both the company and the individuals are to derive maximum benefit.

One of the leading problems facing the foundry industry is the need for adequate foreman training, it was stated by F. G. Garry, Caterpillar Tractor Co., Peoria, Ill. He pointed out that supervisors frequently are not given adequate information as to their duties and responsibilities before assuming foremanship. Also they are not trained in how to do their jobs.

Mr. Garry explained that management today needs supervisors who can handle a different type of worker than was employed in the foundry industry many years ago. The present day worker is a type who asks questions and who must be handled more intelligently. It is not enough, he stated, that channels exist for orders to flow from top management down to supervisors but that the reverse should exist for recommendations from supervisrs to reach management. Among Mr. Garry's recommendations on the subject of foreman training were:

1. Wages should match the position in comparison with the wages of workers.

2. Prestige which will enable the supervisor to have the respect of the workers should be provided.

3. Assistance must be given if it is expected to transform the individual into a capable foreman.

4. Opportunity should be provided for supervisors to work with management and to offer suggestions.

Comment on Training Program

The second Educational Division session comprised a dinner meeting Monday evening at which Ralph L. Lee, General Motors Corp., Detroit spoke on "Management's Stake in Personnel Training" A. W. Gregg presided at the meeting, with Fred G. Sefing, International Nickel Co., New York, as co-chairman. Mr. Lee, in his usual interesting manner, explained that the test of any training program is not merely what the learner carries away with him, but what he does with what he has absorbed. The main fault with many programs is that there is conflict between what is taught in the classroom and what the supervisor tells the individual on the job. While class training is important, Mr. Lee stated, the most effective training is a man-to-man proposition; furthermore, most skills are acquired while actually on the job.

Management has a double role in training work in that it should be both student and instructor, Mr. Lee declared. Every individual can learn something both from those below him and those above. Training is the responsibility of the line organization, he pointed out, but

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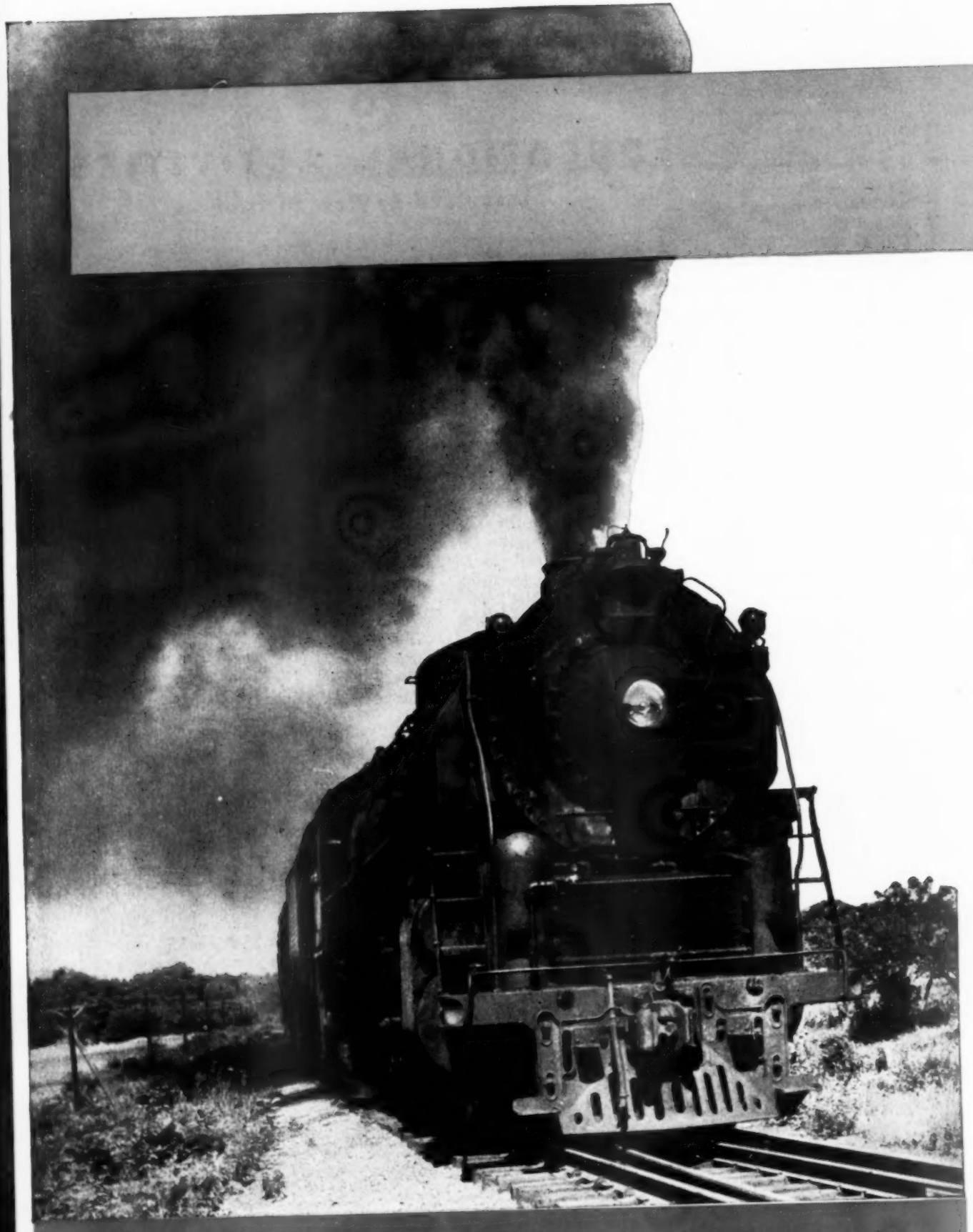

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X-ray inspection is used as a guide to accurate foundry control in the casting of multi-ton locomotive beds. And x-ray has pointed the way to providing more-than-adequate strength with a minimum of excess weight.

Freight car hardware, subjected to severe stress in service, has been vastly improved by use of x-ray control in the foundry. Weight has been decreased, strength has been increased — maintenance costs reduced.

Welded locomotive boilers, recently announced by one of the nation's leading producers of railroad motive power, herald a new era for the iron horse. Every inch of weld is examined with a General Electric X-Ray unit to guarantee the required degree of soundness — freedom from inclusions or porosity.

Use of welded locomotive boilers will provide several important advantages. Elimination of riveted joints, which sometimes permit seepage between boiler plates even when best fabricating technics are employed. Boiler leaks are eliminated because welded boilers remove the possibility of cracked sheets, which can be a major maintenance expense.

The smooth contour of the welded boiler permits an easier application of boiler lagging and jacket and provides an equally smooth surface on the interior. This contributes to more satisfactory wash-outs by maintenance crews.

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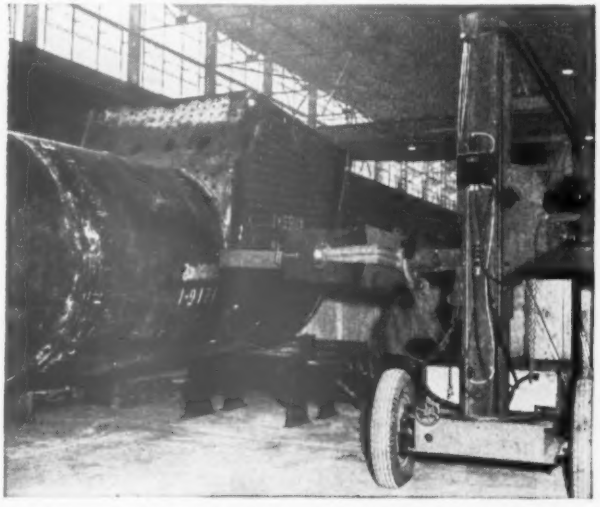


G-E X-Ray shockproof 250,000-volt industrial unit mounted on mobile jib crane, used to examine welded locomotive boilers

GENERAL ELECTRIC X-RAY CORPORATION

(*Continued from page* 139)
in too many cases the job of training is handled like that of painting a factory—the job is ordered done and no further attention is paid it until the work is supposed to have been completed.

DISCUSS CUPOLA OPERATION

At Gray Iron Shop Course

IN OPENING the first of four Gray Iron Shop Course sessions Monday afternoon, W. W. Levi, Lynchburg Foundry Co., Radford, Va., stated that the objective of cupola operators should be to deliver to the molding floor good, hot iron of the proper quality for the castings being poured.

Factors which influence carbon content of iron at the spout, as set forth by Mr. Levi, are: 1. Percentage of steel in the charge. 2. Type of coke used. 3. Carbon content of scrap. 4. Tapping technique. 5. Tapping cycle, if continuous tapping is not used. 6. Increasing iron temperature increases carbon pickup. 7. Accurate weighing of charge ingredients. 8. Properly metered air flow. 9. Clean cupola to maintain its efficiency. 10. Moisture control in air blast. 11. Keeping cupola stacks full to predetermined levels so as not to lose heat. 12. Keeping accurate records of carbon going into cupola in the charge and the carbon content of the iron at the spout.

Mr. Levi added that carbon control and quality control are synonomous. Although silicon content is important it can be altered if found not correct after iron is melted. This is also true of other ingredients, but carbon cannot be added after iron is melted.

Increase Carbon Pickup

The discussion period brought out the fact that higher air blast will increase carbon pickup because iron temperatures will be increased. However, this would not be true if the higher pressure results from a bad cupola condition. As to how carbon pickup varies with differences in the silicon range, Mr. Levi stated that as silicon content increases, carbon is excluded.

E. J. Burke, Hanna Furnace Corp., Buffalo, presided at the session and J. E. Coon, Packard Motor Car Co., Detroit, was co-chairman.

D. E. Krause, Battelle Memorial Institute, Columbus, O., discussed "Effect of Coke Quality on Cupola Melting" at the second session, Tuesday evening. W. W. Levi, Lynchburg Foundry Co., Radford, Va., presided and C. J. Rittinger, American Car & Foundry Co., Detroit, was co-chairman.

Mr. Krause said that the quality of coke used depends on the type of iron to be produced, and further, that a cupola operator operates on the basis of the quality of coke he is accustomed to using. He indicated that an operator accustomed to turning out satisfactory iron with poor quality coke might have difficulty at first when attempting to use good quality coke and vice versa.

Coke properties which affect cupola operation were listed as size, uniformity of size, strength, combustion characteristics and sulphur content. He added that good cupola operation depends to a great extent on proper cupola maintenance, proper weighing of charge and proper size of charging materials. The rate at which air is supplied and its proper distribution are also important.

Coke economy can be improved by maintaining stack heights of not less than 14 ft, using proper air system, good charging methods and proper bed lighting. Furthermore, a good fluid slag flushes off the coke helping it to burn better and give hotter iron. He added that poor quality coke can be offset somewhat by using more coke, and this requires increased air-blast pressure.

The discussion period brought forth the fact that no one present had measured flame temperatures of different types of coke and also that there is no fixed rule regarding the effect of coke split thickness on iron temperature.

A representative of one of the foundries said that he has been using egg size anthracite coal in the cupola to the extent of 25 per cent in splits only. By-product coke is being used in the bed, and the fuel ratio is 5 to 1. No operational changes were made and no changes in iron quality were observed.

It was pointed out, however, that blower equipment must furnish plenty of air to break down the back pressure developed by anthracite which shatters in the air blast. Also a thick slag is developed and it was found necessary to use some dolomite to get a fluid slag.

Another foundryman commented that he used anthracite in the bed and coke in the splits. Another commented that he used 15 per cent anthracite in the coke charge and had a drop of 58 per cent in iron temperature and had to increase the flux.

Use of oxygen in the air blast was suggested to obtain higher iron temperatures. When oxygen is used, the blast pressure must be decreased to reduce oxidation.

In a discussion of beehive coke it was pointed out that its quality varies so greatly that exact practices cannot be set up. One foundry is getting satisfactory results with 80 per cent beehive and 20 per cent by-product coke on a 6 to 1 ratio. Beehive coke gives a relatively high carbon pickup and low iron temperature.

At the third shop course session, Wednesday evening, L. L. Clark, Buick Motor Car Co., Flint, Mich., discussed "Factors Affecting Cost of Cupola Operation." Presiding over the session was J. H. Bernard, Eaton Mfg. Co., Vassar, Mich. K. E. Davis, Cadillac Motor Car Co., Detroit, was co-chairman.

Information used in preparing the paper was digested from a study of cost figures obtained from 30 foundries of all sizes. The study revealed that cost as compared with the total cupola charge cost ranges from 6 to 11 per cent. This was considered high and to be due to poor coke quality which necessitates increased use of coke.

Operational cost on the average should be 25 to 30 per cent of the total metal cost, and this must include the cost of insurance. If operating cost is less than 20 per cent there is a possibility that some of the cost of foundry operation is being omitted. If operating costs run above 30 per cent the cupola mix might not be economical, and costs which should be charged elsewhere might be charged against molten metal. Average cost of metal at the spout for these 30 foundries is 2.2c per lb.

Consider Refractory Costs

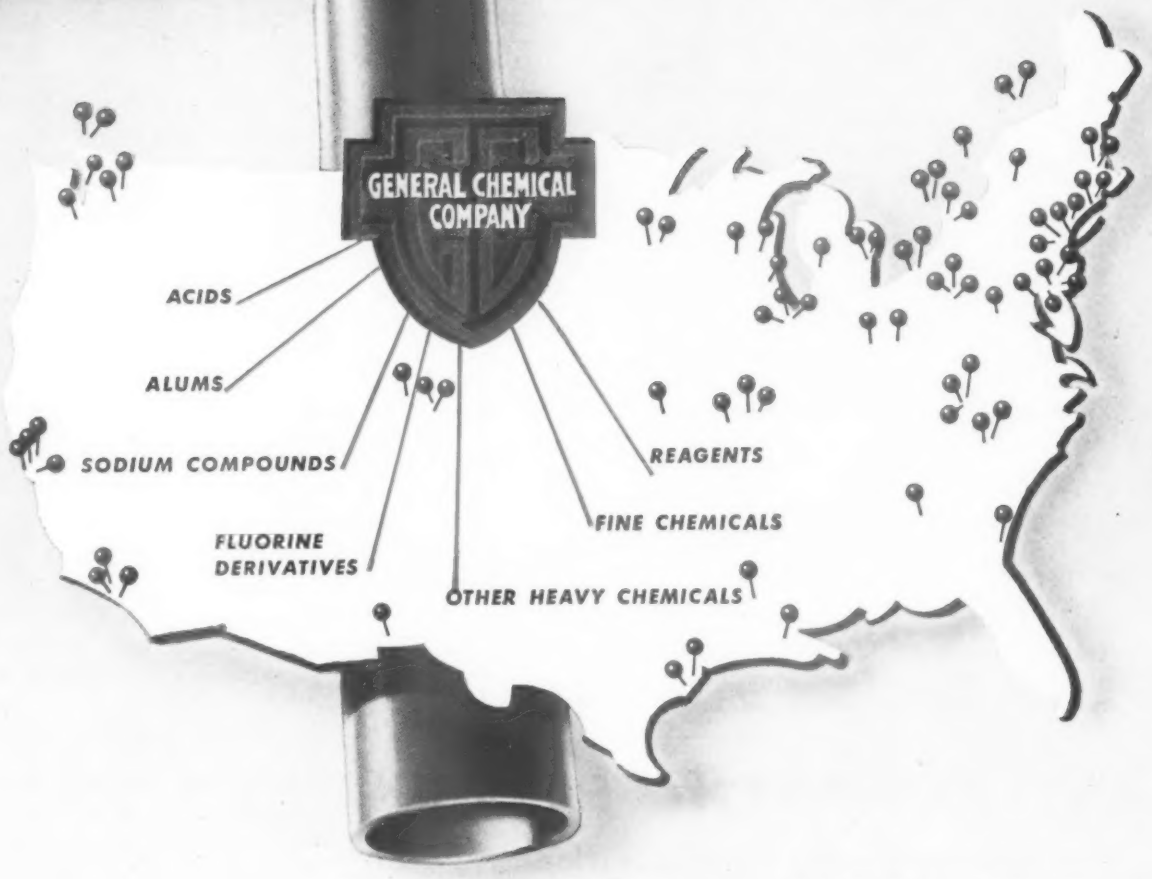
In discussing refractory costs, Mr. Clark indicated that some foundries might be using too good or too poor a lining for the length of time a cupola is operated. He suggested the use of a silica carbide taphole block which, although more costly than other types, lasts longer. He added that water jacketed refractories last longer than other types.

Labor costs should be broken down to direct and indirect costs and all costs should be compared month by month. Payroll costs must be accurately determined. Most foundries spend 6 to 8 per cent more than the apparent payroll costs because of down time which affects not only the melting department but the whole foundry.

Discussion raised the question of effectiveness of a monolithic silica sand lining. One foundryman pointed out that he used Illinois fire clay and Ottawa silica sand mixed 24 hr in advance with 12 to 15 per cent moisture. It is used to a depth of 3 to 4 in. on a 68 to 70

(*Concluded on page* 144)

Supply Line for American Industry...



Here is the supply line of Basic Chemicals for American Industry. North, South, East or West . . . wherever the needs are greatest . . . there, too, are the heaviest concentrations of General Chemical *plants, warehouses,* and *technical service offices*—equipped and prepared to meet the chemical demands of the day.

For almost half a century, this supply line has grown ever stronger. It spans the continent . . . reaches out to the most remote locations . . . always maintaining the full flow of a broad and varied range of chemicals so necessary to peak production.

That is why—in every branch of Industry, everywhere—the choice is General Chemical . . . First in Basic Chemicals for American Industry!

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GENERAL CHEMICAL COMPANY
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GENERAL CHEMICAL COMPANY
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Sales and Technical Service Offices: Albany • Atlanta • Baltimore • Birmingham Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia Pittsburgh • Providence • San Francisco • Seattle • St. Louis • Wenatchee & Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

(*Concluded from page* 142)

in. cupola producing about 350 tons of iron at 2800 F or better over a period of 16 to 18 hr.

It was questioned whether water cooling lowers the melting zone temperature. This brought forth comment that it might lead to bridging in small cupolas of about 20 in. ID, but in larger cupolas there is no apparent effect on metal temperatures. It was also disclosed that cupolas can be operated with a 1-in. split in front of a water cooler and 3-in. refractory in back as a safety factor. When the 1-in. split is burned out the cupola slag forms a lining in front of the cooler.

Additional savings can be effected, amounting to 10 to 15 per cent of the cost of alloy additions, if such addition is made in the receiving ladle at the end of the delivery line just before the metal is poured into the pouring ladles. By doing this none of the alloy is wasted in the heel as might be the case if additions were made in the crane ladle at the spout.

Another comment indicated that in running a cupola dry (down to 100 to 150 lb metal) before dropping the bottom it was found that the additional cost of refractory repair was less than the cost of additional charges to end the run.

Variables affecting electric furnace gray iron formed the subject of a discussion led by K. H. Priestly, Vassar Electroloy Products Inc., Vassar, Mich., at the concluding session shop course Thursday afternoon under the joint chairmanship of H. H. Wilder, Eaton Mfg. Co., Vassar, Mich., and G. A. Timmons, Climax Molybdenum Co., Detroit. Touching on the possible accuracy of control the speaker referred to the desirability of this feature under present conditions of uncertainty in the character and availability of melting material. The charge of miscellaneous material can be manipulated in an electric furnace to an extent either impossible, or at best extremely difficult in the cupola.

Replying to a series of questions from the floor the speaker stated that in melting plain gray iron in the electric furnace there is no loss of carbon or silicon. Recovery of alloys is greater in the electric furnace. While the electric furnace may be employed in raising the temperature of cupola melted metal, it is advisable to tap the cupola metal at approximately 2800 F and use the electric furnace merely as a holding medium. To a specific question he said that a 1-ton heat of cupola metal may be raised from 2500 to 2700 F in 7 minutes. In the speaker's opinion phosphorus has little effect on iron fluidity. Where iron of identical composition is melted in the cupola and in the electric furnace, the iron melted in the electric furnace shows superior physical properties. Composition and manipulation of the slag covering of the bath in steel melting operation is not a factor where the furnace is employed for melting gray iron. Up to the present practically no work has been done or no investigation held on the possible effect of oxidation from the electrodes.

PLANT EQUIPMENT SESSION

Covers Foundry Mechanization

AT A session held Wednesday evening, sponsored by the Plant and Plant Equipment Committee, approximately 125 interested listeners under the chairmanship of E. W. Beach, Campbell Wyant & Cannon Co., Muskegon, Mich., heard a discussion of "Design and Operating Phases of Mechanized Foundries," a paper given by C. O. Bartlett, the C. O. Bartlett & Snow Co., Cleveland.

Mr. Bartlett stated that gray iron foundries seem to constitute the largest group currently interested in mechanization. He pointed out that the ideal mechanized foundry has yet to be designed but essentially a mechanized loop consists of a line of molding machines, mold conveyors, shakeouts, a conveyor system for returning, screening and storing shakeout sand, mullers, and a conveyor system for distributing prepared sand to molders' overhead hoppers. No two plants present the same problem and the layout should be fitted into operating conditions that prevail.

Assisted by the use of slides Mr. Bartlett showed installations, most of which were of prewar design since photographs could not be taken during wartime production. Included in the typical mechanized examples were a mold conveyor, jointed to flex in vertical as well as horizontal plane, permitting cars to move up and down slopes to accommodate various levels; four-wheel mold conveyor cars supported individually and with tops lapping over onto trucks; tilting top type of mold conveyor car facilitating shakeout on snap flask work; terminal rectangular type mold conveyor with cars shuttled around entire track, transfer car at other end being used for return to molding side; hydraulic or air operated piston drive for slow speeds and intermittent operations; revolving cylindrical screen providing lump-breaking action; general arrangement of an entire sandhandling plant.

The speaker brought out in a discussion of the latter group that if mullers are located above foundry operating floor level, building roof line must be raised to accommodate them. Bonding materials and seacoal must be elevated for storage in bins or bags on working platform around the mullers. If mullers are located at or below foundry floor line, pits must be constructed accordingly.

Views were also shown of hand or air operated plows to divert prepared sand from belt conveyor into molders' hoppers; a belt conveyor distributing prepared sand to molders' hoppers; shakeout system for return of overflow sand; hand or air operated molder's hopper gates; rotary table feeders or apron conveyors for handling prepared sand for stationary slinger work; and handling of sand for rapid filling in large flask work by apron conveyor feeders.

Cost Is Limiting Factor

It was brought out that the amount of money available for mechanization has a limiting effect on the layout to be used. Changes in production may later outmode original layout. In conclusion, Mr. Bartlett stressed in the fact that none of the units can function as a whole until all dependent parts are installed. In the discussion following the talk types of cartops for various uses were discussed and it was determined that width and length of car top depends on the purpose for which it is to be used.

Attention was given to maintenance of mold conveyors, shakeout arrangement, depth of pits, location of hoppers and conveyors, all of which must be correlated. Location of screens was considered as well as size and type for foundry demands. It was suggested that a good maintenance man can offer suggestions to the foundry engineer in charge of the layout for modernization, and can be of great assistance in pointing out specific plant problems.

Mr. Bartlett stated that mechanization, while used generally in large foundries, can be applied to smaller plants and can increase production to a great extent.

Editor's Note: Reports on other technical sessions of the AFA annual meeting in Detroit will be presented in the July issue.

Business Handbook

First of a series of Ohio Small Business Handbooks prepared by the Bureau of Business Research, College of Commerce and Administration, Ohio State University, Columbus, O., has been published under the title "Information Sources for Small Businesses."

Castings "come clean"...and your troubles float away!

Of course they do! Because this shakeout is *full-floating!*

If your shakeout isn't full-floating, every time you shake a flask—you shake your foundry. The force of your vibrating mechanism has to go somewhere. When part of that force goes into the building structure, you're wasting power. You're adding unnecessary headaches.

The answer is to install a Robins Floatex Shakeout, *the only genuine full-floating shakeout.* The entire frame rides on soft, heavy-duty coil springs. There are only two bearings—and they do not carry any of the load. No need for heavy foundations to absorb shock and vibration!

No wonder Robins Floatex Shakeouts last longer . . . and require far less maintenance!

Every Robins Floatex Shakeout is adjustable to *your* work. In a matter of minutes, you can adjust a Floatex, which has been handling heavy castings, to shake out light or fragile castings safely and without damage.

In fact, Robins Floatex Shakeouts are handling castings weighing an ounce or two—and flasks weighing 100 tons or more.

It will pay you to consult with Robins now, about equipment for *your* foundry. Our experience, covering all phases of this operation—*including self-discharging*—may help to assure the results you are seeking. For complete information, simply drop a line to Robins Conveyors Division, Passaic, N. J. No obligation!

ROBINS CONVEYORS DIVISION...Hewitt-Robins Incorporated, Passaic, New Jersey

ROBINS
FLOATEX SHAKEOUTS

STATIONARY PORTABLE SELF-DISCHARGING

3 TYPES DESIGNED TO HELP YOU 6 WAYS:

1. Save Time
2. Reduce Labor
3. Help Sand Recovery
4. Cool Hot Sand
5. Minimize Flask Breakage
6. Improve Working Conditions

Now . . .
for prompt delivery
ARCADE No. 91 JOLT SQUEEZER

You know this sturdy, well balanced machine – it has a well-earned popularity as a jolter, a plain squeezer or for both operations on the same mold. Lifting capacity is so far in excess of a man's ability that overloading is impossible.

Like all machines bearing the Arcade name, No. 91 maintains a family tradition far from easy to live up to. It absorbs hard punishment, keeps its accuracy and is always dependably ready for more . . . It's a source of keen satisfaction that Arcade machines behave in the creditable manner expected of them.

Look for further important developments at Arcade. If you expect to be in the market for equipment in the near future, it's a good idea to talk now to Arcade engineers.

ARCADE MANUFACTURING DIVISION
ROCKWELL MANUFACTURING COMPANY
FREEPORT, ILLINOIS

PUBLICITY CAMPAIGN

Boosts Erie Area Foundry Industry

ONE of the most comprehensive local publicity campaigns ever conducted to make the public better informed regarding the foundry industry and to emphasize the desirability of foundry employment, recently was sponsored by the Northwestern Pennsylvania Chapter of the American Foundrymen's Association.

In addition to five 8 x 11 in. newspaper advertisements, which are reproduced here, the publicity included 15,000 copies of a booklet, entitled "Your Future in the Foundry," which were distributed through foundries and to schools, boys' clubs, YMCA's and other places where boys would have an opportunity to read them. Support of local newspapers was obtained in publishing human interest stories about foundry workers, thus sustaining the effort to keep the campaign's keynote before the public.

The campaign culminated in a "Grand Slam" night featuring a banquet, Apr. 21, at the Masonic Temple, Erie, Pa., attended by 825 people and at which the Northwestern Pennsylvania Chapter paid tribute to 675 men in northwestern Pennsylvania who have been active in the foundry industry for 30 or more years. In addition, management executives of the industry were honored along with national AFA officers.

Six weeks in advance of the banquet the series of advertisements was started. Every newspaper in the area carried an ad, the amount of space used in each medium and each community being determined by the number of foundries and foundry employees in that community.

Based on the idea of a man-to-man talk between an experienced foundryman and his son, the series of ads started out with a question by the son:

"Say, Dad, what's a Foundry?" "A Foundry is a basic industry, Son. Do you know that 90 out of every 100 industries in operation today must use some type of casting in their finished product? And those castings must come from a Foundry. That means that at all times there is a need for Foundry products. Let's take a few examples. In the average five-room home there are over two tons of castings. There are more than three tons of castings in a steam shovel, and over 600 pounds of castings in an automobile. No matter where you look, you see the results of many skills working together in a Foundry."

The second ad pointed out that "There are over 327 different types of work from which to choose your future" in the foundry industry. "The foundry offers a variety of jobs. Foundry work ranges from simple materials handling, to jobs in all the fundamental foundry departments, and to highly trained technical research. There are 327 different types of workers in the foundry industry according to the U. S. Department of Labor. Foundries need pattern makers, molders, melters, chemists, metallurgists, casting designers, draftsmen, mechanical engineers, salesmen, accountants, maintenance men, electricians, carpenters, timekeepers, office workers and other employees with specialized knowledge."

The question of wages was discussed in the third ad, which stated that "The foundry is one of the best paying industries in the country today. In this area pay is particularly good. Foundry workers own homes, raise families, and send their children to college. They own automobiles, go hunting and fishing, play golf, participate in church activities, are active in civic affairs, and live a life as full and interesting as others do. The foundry offers a wage scale that enables

(*Continued on page* 150)

"Is there a Future in the Foundry industry, Dad?"
"Yes, Son, Foundries need young men to train for key positions."
Send for this free booklet

"What jobs are available in a Foundry, Dad?"
"There are over 327 different types of work from which to choose your future."
Send for this free booklet

"What are wages like in the Foundry industry, Dad?"
"Son the Foundry is one of the best paying industries in the country today."
Send for this free booklet

Photo of Exhibit at Cleveland, 1946

FAMOUS CORNELL FLUXES

Trade Mark Registered

Famous CORNELL BRASS FLUX

CLEANSES MOLTEN BRASS, even when the dirtiest brass turnings are used.

Castings come tougher, sounder and denser grained, which is vitally essential in the manufacture of any casting that must stand the pressure test and take an extra fine finish. Several elements in this flux combine to gather the gases, while the metal is being melted and cause them to form into balloon shaped bubbles and rise to top of metal in the form of slag which is very essential as a cover to retain heat during transfer of metal to molds.

Less tin and other metals are required. Crucible and furnace linings are preserved.

Write for Bulletin No. 46-A

Famous CORNELL ALUMINUM FLUX

CLEANSES MOLTEN METAL, thereby playing an important role in the production of sound tough castings.

More scrap can be used without danger of dirt, porous places or spongy spots.

Thinner yet stronger sections can be poured.

NO FUMES! Exclusive formula prevents obnoxious gases, improves working conditions.

Metal does not cling to dross.

Write for Bulletin No. 46-A

Famous CORNELL LADLE FLUX

KEEPS LADLES CLEAN AND CLEANSES IRON. Before tapping cupola, place a few ounces of this flux in bottom of ladle. It thoroughly cleans the iron, bringing any impurities to top of metal in the form of a cake which is easily skimmed off. If molds are some distance from cupola, a handful of our ladle flux sprinkled on top of metal acts as a cover and prevents chilling.

Famous Cornell Ladle Flux increases ladle life, reduces patching, etc.

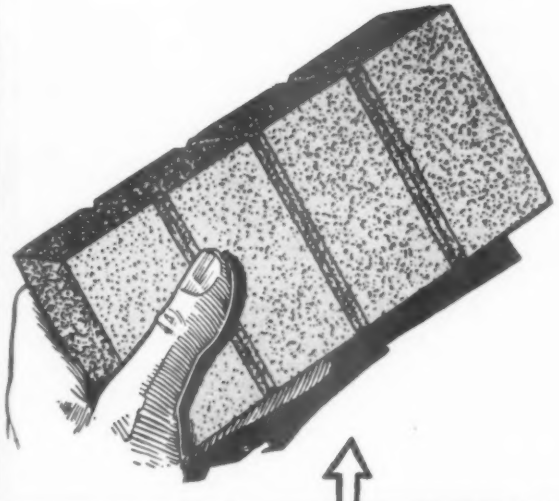
LEADING FOUNDRIES
REGULAR USERS
For Years

METAL STRUCTURE IS DEFINITELY IMPROVED WITH

Famous CORNELL FLUXES

MORE FLUID — CASTINGS ARE DENSER GRAINED, STRONGER

Famous CORNELL CUPOLA FLUX
(IN EXCLUSIVE SCORED BRICK FORM)



You can use the best pig iron, the right amount of coke and limestone, but when scrap is added impurities are bound to exist in the charge. Therefore, how can you get the best castings and cut rejects and make-overs to the minimum without the elimination of foreign matter before cupola is tapped?

Leading foundries are keeping the standard of their castings HIGH by the regular use of Famous Cornell Cupola Flux. Their castings come denser grained, stronger, cleaner and are easier to machine.

CLEAN CUPOLAS, CLEAN DROPS—another definite advantage of using Famous Cornell Flux. This flux forms a glazed or vitrified surface on brick in melting zone, which not only keeps it clean but greatly prolongs brick life and cuts maintenance cost amazingly.

Write for Bulletin 46-B

ITS SCORED BRICK FORM GREATLY SIMPLIFIES THE USE OF FLUX

You can flux a charge of iron in a few seconds—correctly. Simply toss one brick into cupola for each ton charge of iron or break off a briquette (quarter section) for each 500 pound charge. NO WASTE! Famous Cornell Cupola Flux does not blow out with the blast—it stays in melting zone until entirely consumed.

The **CLEVELAND FLUX** *Company*

1026-1036 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Brass and Aluminum Fluxes Since 1918

Eight of the old timers honored by Northwestern Pennsylvania Chapter. Years of their foundry service are shown in parentheses: Back row—Martin Bach (57), Erie City Iron Works; Charles Jarecki (60), Jarecki Mfg. Co.; William Barber (55), Erie Forge Co.; Ernst Winefeld (52), Cascade Foundry Co. Front row—Joseph Stablein (62), Jarecki Mfg. Co.; George Nuber (51), Superior Bronze Co.; Mike Furey (52), National-Erie Corp.; Emil Weber (54), Cascade Foundry Co.

(*Continued from page* 147)

you to do everything that other average people do."

The fourth ad answered the question, "Is there a future in the foundry industry?" as follows: "Yes, son, foundries need young men to train for key positions. The foundry industry is constantly looking for young men to whom they can give additional training and move on up to more important responsible positions. If you show aptitude and intelligence and a desire for advancement, your superiors will be only too glad to give you an opportunity to move ahead. It may take work and study, but the opportunities are well worth the effort. Another thing to remember about your future in the foundry industry, a foundry is a basic industry and as long as other industries are operating, there is need for foundry products. Ninety out of every 100 industries in operation today use some type of casting in their finished products."

The concluding ad announced the testimonial dinner that was held in honor of the district's 675 men who have spent more than 30 years each in the foundry industry. This ad was repeated the day of the dinner and included the names of the 675 men. All of the ads invited readers to send for a free copy of the booklet, and listed the names of members of the Northwestern Pennsylvania Chapter. The booklet was planned on the same conversational theme between a foundry "Old Timer" and his son as were the ads.

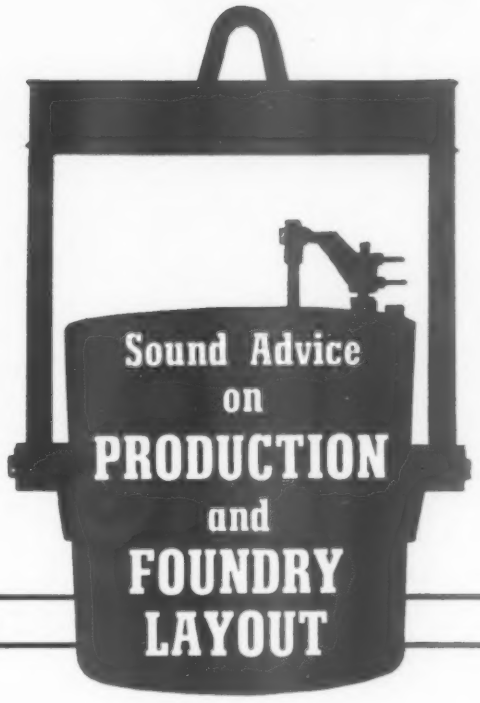
The entire campaign was organized by the Northwestern Pennsylvania Chapter directors headed by Chapter Chairman Earl Strick, Erie Malleable Iron Co., Erie, and was supported by all of the area's 46 foundries. Joseph A. Shuffstall, National-Erie Corp., Erie, was chairman of arrangements for "Grand Slam" night. Davies & McKinney, industrial advertising firm of Erie, donated its services in preparation of the advertisements and booklet.

Paul H. Vincent, general manager, Erie Malleable Iron Co., was toastmaster at the banquet and presented the keynote of the occasion, "The Foundry is a Good Place to Work," Ralph Rycroft, Kencroft Malleable Co. Inc., Buffalo, a national director of AFA, praised the efforts the veteran foundrymen and their contributions to the industry. Lee Wilson, Reading, Pa., past national AFA president, expressed the need for more young men in the foundry industry. William W. Maloney, AFA national secretary-treasurer, described some of the functions of the association and the aims of the new Foundry Educational Foundation.

Invited guests at the banquet also included the mayor, local congressman, presiding judge, heads of city, county, public, trade and parochial schools, state employment and Veterans' Administration representatives, officers of the Chamber of Commerce and Manufacturers' Asso-

(*Concluded on page* 153)

Scenes at the Apr. 21 meeting in Erie, when 675 veteran foundrymen of the district were honored



Brass—Bronze—Aluminum—Magnesium

Steel—Malleable—Gray Iron

If you are contemplating a NEW foundry or the modernization of your existing plant, we offer you our specialized experience in the design, construction and operation of modern foundries. Foundry layouts, production studies, special machinery and tools for efficient foundry operation—we have concentrated exclusively on the successful solution of these problems for the past quarter-century.

We invite you to send for a copy of

BULLETIN "F"

which discusses the problem of foundry modernization

A. A. WICKLAND & CO.

Foundry Engineers.

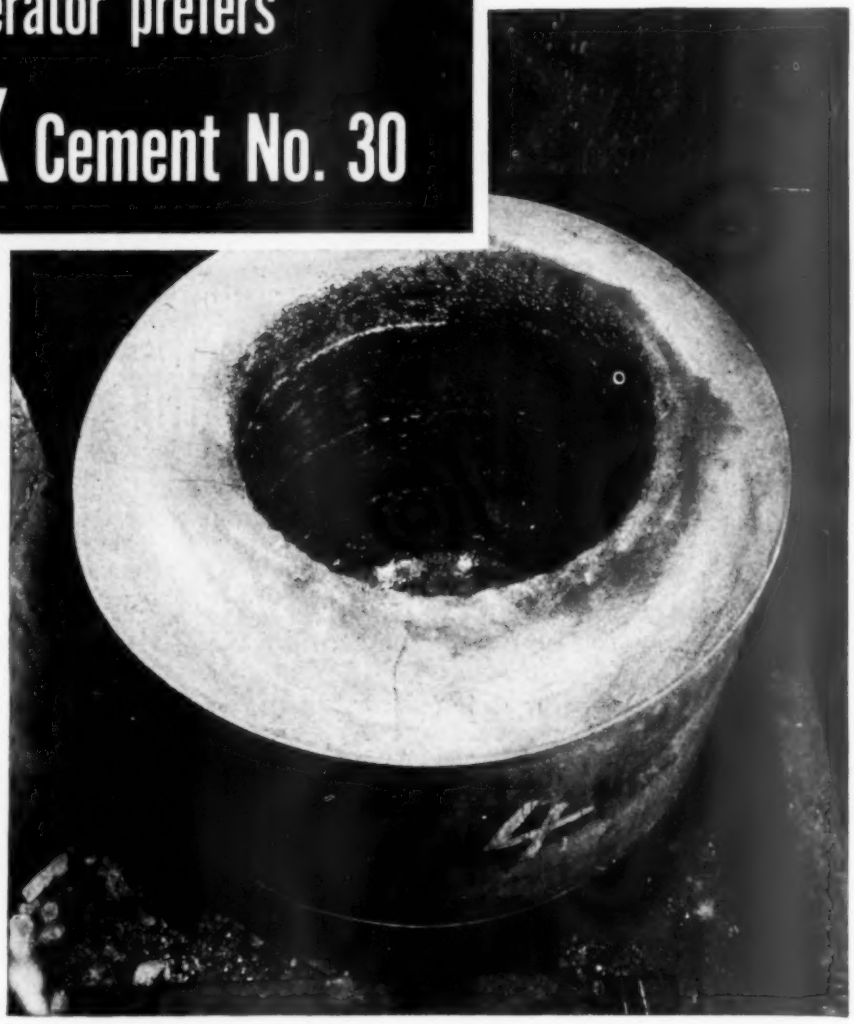
ENGINEERING BUILDING Established 1919 CHICAGO 6, ILLINOIS

3 REASONS WHY

Furnace Operator prefers

CARBOFRAX Cement No. 30

Oil Fired Crucible Furnace placed in operation Sept. 14, 1945. No maintenance to date. 3½" CARBOFRAX Cement No. 30 lining is backed up with 1" of refractory insulating splits and 1" of mineral wool batts.



1 LONGER SERVICE

2 LESS UPKEEP

3 RAMS BETTER

Because of reasons such as these, every crucible type melting furnace in this plant is now lined with CARBOFRAX silicon carbide cement No. 30.

Melting monel, nickel, S-monel, and inconel metals, furnaces are run eight hours daily, five days per week. Operating conditions are particularly tough. Incapable of withstanding them, ordinary refractory linings were replaced every six weeks. With CARBOFRAX linings an average life of 15 months service is secured with very limited patching. Maintenance expense is cut way down.

Easily worked, CARBOFRAX cement No. 30 rams into a hard, dense lining that does not soften. That's because of its high refractoriness. Flame erosion, too, is resisted successfully. Freedom from frequent patching is provided. With longer life from a CARBOFRAX lining, replacement is not required at short intervals.

Offering a lower lining cost per pound of metal melted, CARBOFRAX cement No. 30 is applied to both stationary and tilting furnaces. Check its possibilities for your work. Secure complete information by writing Dept. L-67, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

SUPER REFRACTORIES

BY CARBORUNDUM

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

(*Concluded from page* 150)

ciation, AFL and CIO union council heads and newspaper representatives.

Main speaker of the evening was John H. Van Deventer, director of information, Committee for Economic Development. Mr. Van Deventer stated that the United States can avoid another disastrous depression by stabilizing mass production methods. He went on to say that under our system some economic fluctuations are unavoidable, but it is the aim of the CED to create understanding of the causes of these variations so that steps can be taken to prevent them from assuming the marked swings that lead to major depressions.

Awards were presented during the evening to eight outstanding veterans with service records ranging from 51 to 62 years, while two others in a supervisory capacity were given honorable mention.

Recipients of the awards and their years of service were: Joseph Stablein, Jarecki Mfg. Co., 62 years; Martin Bacō, Erie City Iron Works, 57 years; William Barber, Erie Forge Co., 55 years; Fred Wolcott, Griswold Mfg. Co., 54 years; Emil Weber, Cascade Foundry Co., 54 years; Mike Furey, National-Erie Corp., 52 years; Ernest Winefeld, Cascade Foundry Co., 52 years and George Nuber, Superior Bronze Corp., 51 years. Honorable mention was accorded to John Eckels, Erie Bronze Co., 62 years, and Charles Jarecki, Jarecki Mfg. Co., 60 years.

Book Review

High-Pressure Die Casting, edited by H. L. Harvill and Paul R. Jordan, consultant, 130 pages, published by H. L. Harvill Mfg. Co., Vernon, Calif. Price $5.00.

The authors have emphasized the design aspects of die casting rather than the analysis of the end use of parts produced by this method. Process of die casting and metals used is clarified for the sake of readers who may have no previous knowledge of or experience with die casting techniques. Balance of the text emphasizes types of dies and varying degrees of complexity, relationship of casting design to die design, and comprehensive discussion of important elements of correct design of parts to be produced by this method. Considerations such as draft or taper on all surfaces of the casting, effect of sectional variation on metal shrinkage and upon finished product, use and correct design of hubs and bosses, practicability of die cast threads and the use of cast-in inserts are covered and each subject is fully illustrated. A comprehensive and usable chart of tolerances is given.

Institute of Metals Meets in London

Thirtieth annual general meeting of the Institute of Metals (British), the first to be held since the war, took place in London on Mar. 5, 6 and 7. Col. P. G. J. Gueterbock, Copper Pass & Son Ltd., Bristol, was elected president for the second year in succession, and John Cartland, Fry's Metal Foundry Ltd., London, was elected vice president. The following were elected as members of the council: Prof. Leslie Aitchison; John Arnott; Dr. Maurice Cook; A. J. Murphy. The secretary stated that the total membership of the institute to date was just over 3000, an increase of 10 per cent over the total at the end of the previous year. It was announced that the May Lecture would be given by Wallace Akers, Imperial Chemical Industries Ltd.; the subject will be on atomic energy and its applications to peacetime purposes.

Society Awards Medal

President Gueterbock addressed the meeting and expressed his thanks for his re-election, and mentioned that the institute would be represented at the centenary celebration of the American Institute of Mining and Metallurgical Engineers, by Dr. Bailey and that Professor Desch would also be present. He then proceeded with the presentation of the Institute of Metals platinum medal, which was awarded jointly to Dr. J. L. Haughton and Dr. Marie L. V. Gayler (Mrs. Haughton). The award was made in recognition of the recipients' brilliant scientific work, particularly on the structure of light alloys.

The first three papers to be presented at the meeting were discussed jointly. They were: "Hot-Shortness of the Aluminum-Silicon Alloys of Commercial Purity," "Hot-Shortness of Some Aluminum-Iron-Silicon Alloys of High Purity," by A. R. E. Singer and P. H. Jennings, department of metallurgy, University of Birmingham, and "Properties of Aluminum-Silicon Alloys at Temperatures in the Region of the Solidus," by A. R. E. Singer and S. A. Cottrell.

A paper on "Effect of Iron and Silicon Impurities on the Tensile Properties and Heat Treatment Characteristics of Sand Cast Aluminum" was presented by Dr. R. T. Parker, senior research metallurgist, Aluminum Laboratories Ltd., Banbury, Miss G. M. L. Cox and A. N. Turner, research metallurgists at the same laboratory.

It had been observed in the past that, under commercial conditions, sand cast test bars of aluminum—10 per cent magnesium alloy had variable tensile properties occurring both within and between groups of bars cast from different melts. In the investigation described, the differences between test bars prepared from the same melts of the alloy were almost eliminated by careful foundry technique, those remaining occurring only with metal of greater impurity content. To explain the differences between melts, groups of D. T. D. test bars were cast in dry sand from melts containing 0.10-0.75 per cent Fe with 0.10-0.50 per cent Si. It was found that, while an increase of iron has a slightly beneficial effect, an increase of silicon drastically reduces the ultimate tensile strength and elongation. The optimum tensile properties of an alloy containing 0.10 per cent Fe and 0.10 per cent Si appear to be approximately 55,000 psi. ultimate tensile strength and 35 per cent elongation on 2-in., these values being obtained from test bars solidified under an air pressure of 100 psi.

A. J. Murphy, director and chief metallurgist, J. Stone & Co. Ltd., Deptford, London, and R. J. M. Payne, metallurgist at the same company, presented a paper on "Magnesium-Cerium-Zirconium Alloys: Properties at Elevated Temperatures."

"Some Factors in the Reduction of the Iron Content of Magnesium Base Alloys" was the title of a paper presented by F. A. Fox, chief metallurgist, Magnesium Elektron Ltd., Clifton Junction, near Manchester, and C. J. Bushrod and S. E. Mayer, of the same company. In this paper the authors recall that small quantities of iron, present as an impurity, are removed from magnesium base molten metal by allowing manganese-rich particles to settle out of the molten metal. The authors carried out experiments to establish the optimum conditions for the mechanism to operate. Although the removal of the iron from magnesium-aluminum alloys is efficiently carried out by the process, particularly if two successive settling operations are employed, it is not so readily accomplished in the case of binary magnesium-manganese alloys. Virgin melts do not give such good results after treatment as do melts containing considerable proportions of secondary ingot, apparently because of the lower initial iron content of the latter. Possible mechanisms for the iron removal process are discussed in relation to the results of small, medium and large scale settling experiments. Additional experiments were carried out to ascertain the most suitable steel for crucibles for remelting the alloys of low iron content. A high manganese, high carbon austenitic steel gave the most interesting results.

Central Castings Co., 607 Ann St., St. Joseph, Mich., has been formed by G. M. Potter with capital of $50,000 to manufacture and sell metal castings.

General view of luncheon session opening the meeting

Texas Foundrymen
Meet in Lufkin

"ALL Roads Lead to Lufkin" was the slogan of Texas foundrymen when the Texas Chapter of the American Foundrymen's Association held its National Officers' Meeting at Lufkin, Tex., Apr. 11. The spring meeting at Lufkin has become an annual affair of the foundrymen of the Lone Star State. Representatives of castings producers from practically all industrial sections of the state were on hand for the affair.

The meeting was officially opened with a luncheon at the Angelina Hotel at which A. E. Cutlipp, Lufkin Foundry & Machine Co., greeted the visiting foundrymen and introduced the out-of-state guests, who included Sheldon V. Wood, president of the AFA, St. Paul, William W. Maloney, secretary of the AFA, Chicago, Frank G. Steinebach, editor of THE FOUNDRY, Cleveland, and David G. Anderson, foundry engineer, National Founders Association, Chicago.

Mr. Anderson gave a brief talk on the work and purposes of the National Founders Association, and mentioned the recent formation of the National Castings Council. Ed C. Burris, executive vice

(*Concluded on page* 156)

Left—Speakers at the meeting included, left to right: S. V. Wood, president, AFA; E. P. Trout, Lufkin Foundry & Machine Co.; W. W. Maloney, secretary-treasurer, AFA; W. C. Trout, Lufkin Foundry & Machine Co.; D. G. Anderson, National Founders Association; F. G. Steinebach, *The Foundry*

Below—Speaker's table at the opening meeting

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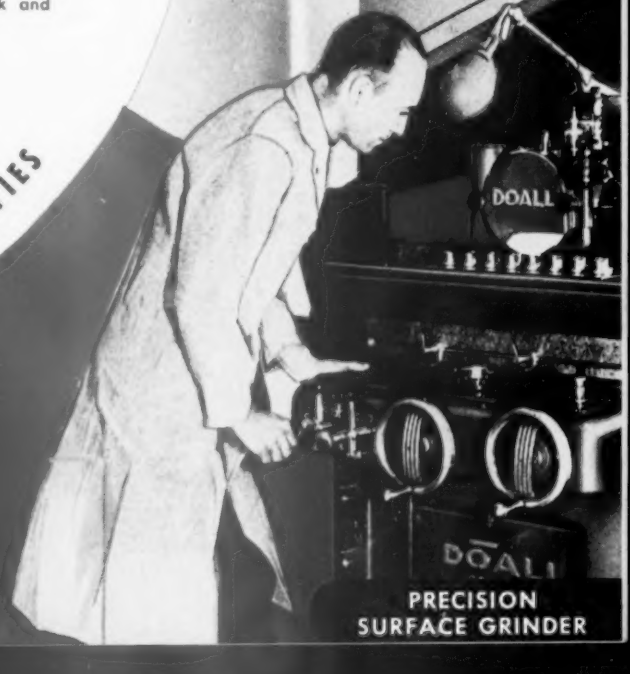

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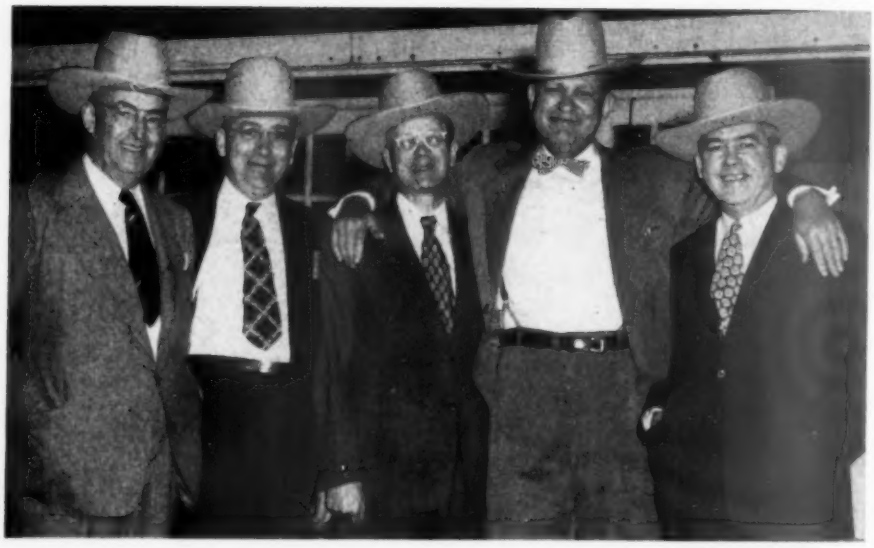

Left—Speaking before the evening meeting at Lufkin Country Club are, top to bottom: S. V. Wood; F. G. Steinebach, and W. M. Ferguson, Texas Chapter chairman

Above—Guests from the North were presented with "10-gallon" Texas hats by Martin Dies, former U. S. Congressman. Left to right are S. V. Wood, F. G. Steinebach, D. G. Anderson, Mr. Dies and W. W. Maloney

(*Concluded from page* 154)

president, Texas Manufacturers' Association, Houston, Tex., discussed the work of that organization and its effect upon the industry of the state. Mr. Burris also told of legislation pending before the state legislature at Austin which was of particular importance to the industry of the state.

W. C. Trout, president, Lufkin Foundry & Machine Co., whose untimely death one week later is reported elsewhere in this issue, described the industry of Lufkin and told of the industrial growth of the district from a small lumber business to a city which has many lumber mills, a large paper mill, modern foundries and machine shops. Mr. Trout welcomed the foundrymen of Texas to Lufkin and invited all to attend the formal opening of the new modern foundry of the Lufkin Foundry & Machine Co. that afternoon.

During the afternoon the visitors inspected the new foundry and also visited the excellent malleable foundry of Texas Foundries Inc., which now is in the process of further mechanization. In the matter of plant visitation, Lufkin probably offers as much in the way of modern foundries as any city its size in the country.

In the evening, the chapter members and guests gathered at the Lufkin Country Club where a real Texas style barbecue meal was served. The meeting which followed the dinner was opened by former congressman Martin E. Dies, who gave a brief inspirational talk on the place of industry in our modern civilization. Mr. Dies then introduced Mr. Wood, Mr. Maloney, Mr. Steinebach, and Mr. Anderson and presented each with a 10-gallon Texas cowboy hat in honor of their first visit to Texas. The smiling countenances of the recipients of these gifts, and the master of ceremonies who engineered the presentation are shown in an accompanying illustration.

W. M. Ferguson, Texas Electric Steel Castings Co., Houston, Tex., and chairman of the Texas Chapter of the AFA then took over the meeting and called upon the out-of-state visitors for a few remarks. Mr. Wood and Mr. Maloney explained the aims and purposes of the American Foundrymen's Association and indicated the way in which it can benefit foundries and foundry employees. Mr. Steinebach complimented the foundrymen of Texas for their enterprise and outlined briefly the possibilities for future progess of the casting industry.

C. H. Bone, process metallurgist, Sheffield Steel Co., Houston, Tex., presented a technical talk on "Coke and Coking Coals for Blast Furnace Operation."—*M. W. Williams, Hughes Tool Co.*

Plan Scholarships

Texas Foundries Inc., Lufkin, Tex., has established two scholarships for engineering undergraduates at Texas A and M College, College Station, Tex., according to Dr. Howard W. Barlow, dean of engineering. The scholarships were established by the foundries as a pretraining testing plan for employees who will work for the foundry in the future.

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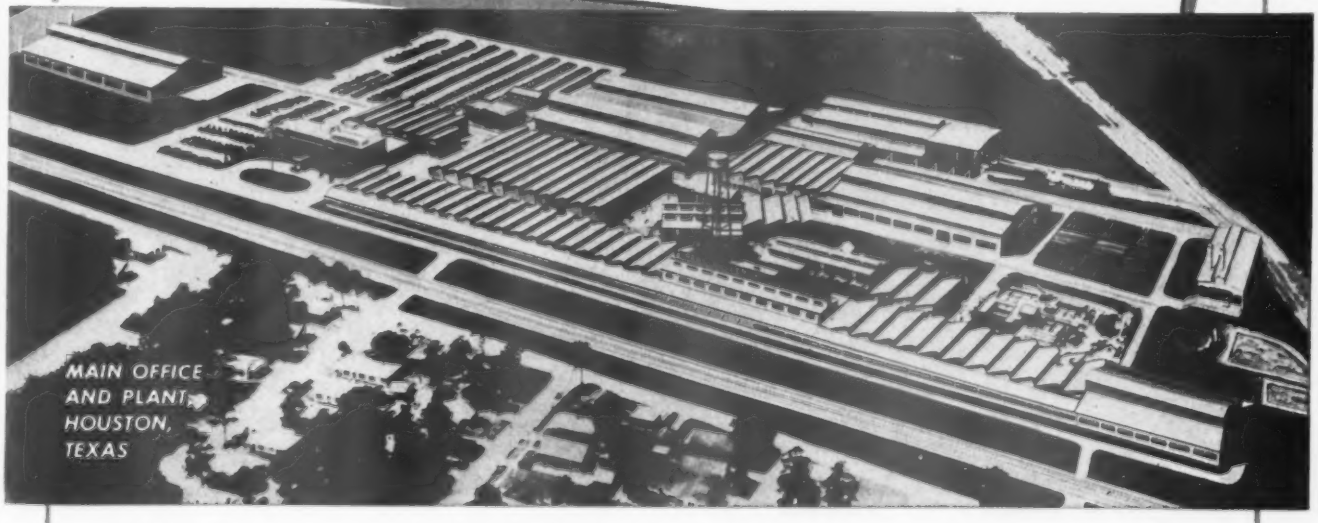
You can be assured of the traditional Reed Service . . . prompt, dependable, efficient. Send us your inquiries.



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OBITUARY

W. C. TROUT, 74, president of the Lufkin Foundry & Machine Co., and chairman of the board of directors and former president of Texas Foundries Inc., Lufkin, Tex., died Apr. 24, at Dallas Medical and Surgical Clinic, Dallas, Tex., following an operation. Early in life Mr. Trout became associated with a small manufacturing plant where he become experienced in machine and foundry production. In 1893 he accepted a position with the Allis-Chalmers Mfg. Co., Milwaukee, as a draftsman in the saw mill department. Later he became foreman and a contracting engineer for the company, and designed and sold lumber plants all over the country. He moved to Texas in 1905 and bought an interest in the Lufkin Foundry & Machine Co., which changed under his guidance from an organization employing 35 persons to the modern plant of today employing over 600. The organization has played a prominent part in the welfare and growth of the city. Beloved by his employees, Mr. Trout's industrial and humanitarian contributions were widely known in Lufkin, Angelina county, the state of Texas, as well as throughout the nation. He was the father of three sons, Walter W., Edward P., and Howard J., all of Lufkin.

W. C. TROUT

* * *

H. Scott Cameron, 64, president and general manager, Maritime Steel & Foundry Co., New Glasgow, Nova Scotia, died shortly after a major operation in the Royal Victoria General hospital, Montreal, Apr. 25. In his youth he learned the blacksmith trade under his father. Later after working for some time in the United States he returned to Nova Scotia and was employed by the J. W. Cummings Mfg., Co., at that time operating a forge and fabrication plant in New Glasgow. After assuming a supervisory position he was largely instrumental in installing a steel foundry and developing a wide market for steel castings. He served as general chairman of the committee which arranged the first Maritime foundry conference of the Ontario and Eastern Canada and Newfoundland Chapters of the American Foundrymen's Association in New Glasgow, in 1944.

* * *

Louis Draves, 80, who retired 10 years ago as foreman of the gray iron foundry, Pullman-Standard Car Mfg. Co., Michigan City, Ind., died May 1, at his home in that city. Mr. Draves was born in Posen, Germany, and had been a resident of Michigan City for 78 years. He was a molder at the Pullman-Standard Car Mfg. Co. and the Haskell & Barker plant there for 48 years.

* * *

William Fenton, president, the Fenton Foundry Supply Co., Dayton, O., died Mar. 29, at his home in that city. Mr. Fenton, a native of Scotland was associated with the S. Obermayer Co. Chicago, for 24 years. For the last 26 years he has been president of his own company and was active in the business until shortly before his death.

* * *

Charles P. McConnell, 65, who retired in 1944 as chairman, Central Scientific Co., Chicago, died April 7 in Evanston, Ill. Associated with the company about 30 years, he was its president from 1937 to 1941.

* * *

W .W. Sherman, 54, foundry manager, the Electric Auto-Lite Co., Toledo, died Apr. 18, following an illness of 10 months. Mr. Sherman had been associated with the company for 25 years.

* * *

J. Eugene Neely, 50, purchasing agent and assistant secretary, Ohio Steel Foundry Co., Lima, O., died Apr. 13. Mr. Neely had been associated with the company for 34 years.

* * *

R. E. Persinger, 76, treasurer and a member of the board of directors of Wagner Malleable Iron Co., Decatur, Ill., died Apr. 16 at his home in Decatur.

* * *

Lewis E. Megowen, 55, representative for the Marathon Foundry & Machine Co., Wausau, Wis., died Mar. 22.

Foundry Display Stresses Job Opportunities

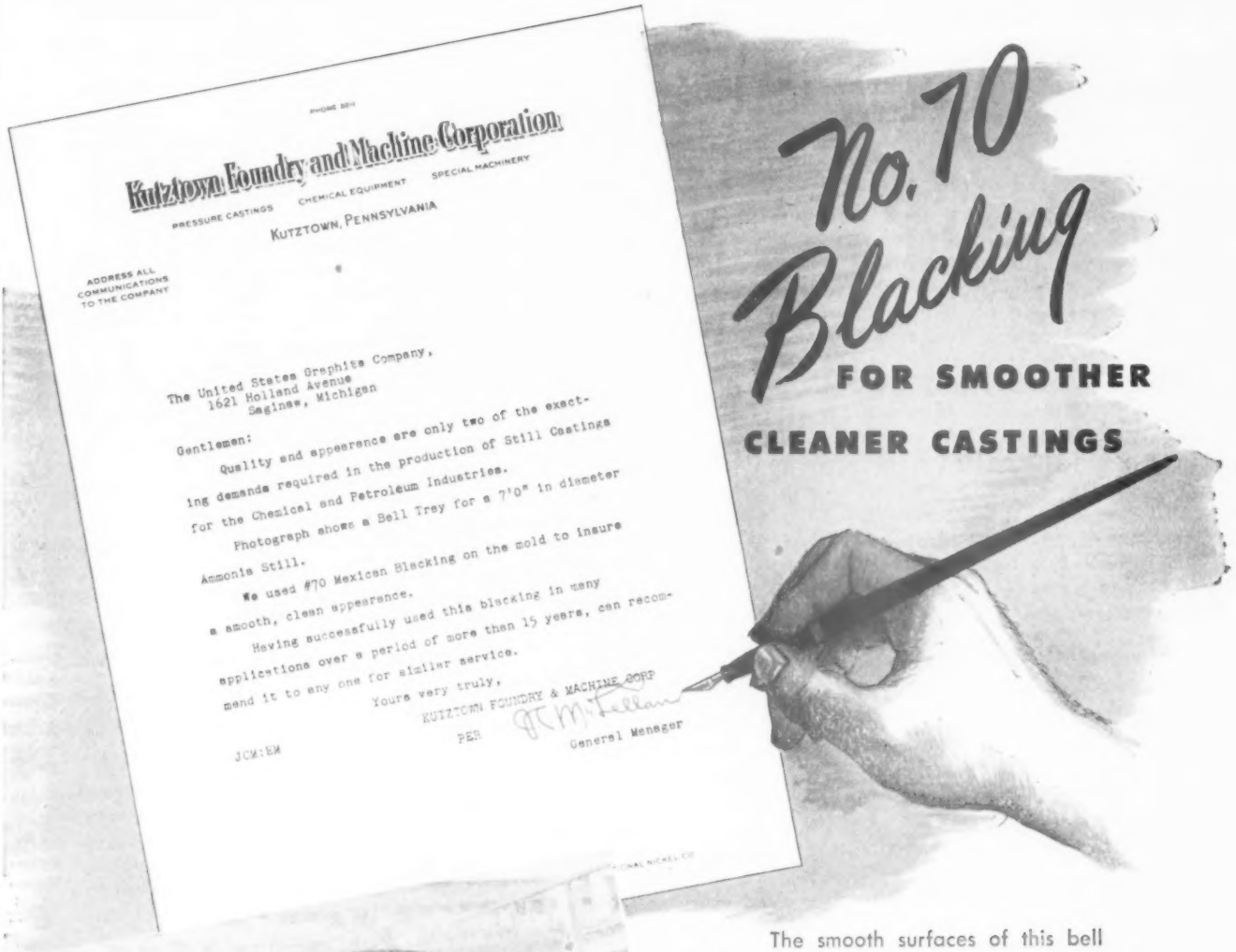
AS PART of a series of displays sponsored by Lane Public Library, Hamilton, O., on the theme that the library helps Hamilton industry, products of Hamilton Foundry & Machine Co. recently were shown in a local bank.

Previous displays in this series had featured the products of various companies and the technical books available at the library in line with the manufacture or processing done at the plants. The Hamilton display however, emphasized the desirability of various foundry jobs.

A device at the extreme left of the picture labeled with the card "Rubber Iron?" is a mechanical unit which twisted one of Hamilton Foundry's grids back and forth in an attention-getting manner. The display included one of the company's intricate castings and a few of the more interesting cores which were tied in with the statement that the foundry is one of the few remaining industries which offer an opportunity for real creative work.

Foundry Facts

Sixth edition of *Facts for Foundrymen* by Ernest G. Jarvis and Herbert O. Jarvis has been published by the Niagara Falls Smelting & Refining Division, Continental-United Industries Co. Inc., 2200 Elmwood Ave., Buffalo 17. Booklet is pocket size containing 80 pages. In addition to describing the various alloys and products produced by the firm, information is given on foundry practice.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We used #70 Mexican Blacking on the mold to insure a smooth, clean appearance.
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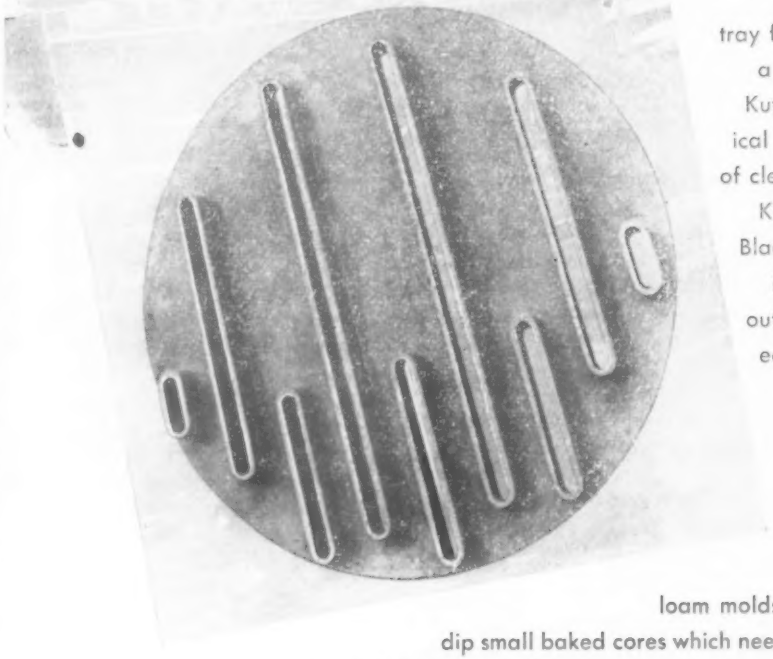

The smooth surfaces of this bell tray for a 7' diameter ammonia still, just one of a wide variety of castings produced by the Kutztown Foundry and Machine Corp. for the chemical and petroleum industries, require only a minimum of cleaning—thanks to No. 70 Blacking. No wonder Kutztown writes, recommending the use of No. 70 Blacking. This versatile mold coating penetrates deeply into sand surfaces to form a hard coat which turns out smoother, cleaner castings. It is economical and easy to use. No. 70 can be sifted dry through a cloth bag in treating green sand molds, for it draws sufficient moisture to bond to the sand; or it can be mixed with water to make an excellent wet blacking which assures a hard coat with maximum sand penetration for light and medium weight dry sand, skin dried and loam molds. It is also used by many production foundries to dip small baked cores which need extra protection under intense metal conditions.

- No. 70 Blacking, used by Kutztown in many applications for 15 years and preferred as a general purpose blacking by many other leading foundries, will help you to produce cleaner castings with less trouble and expense. Write for complete particulars.

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IMPORTANCE AND FUTURE OF FOUNDRY INDUSTRY

(*Continued from page* 83)

but also by many foundrymen. And if foundrymen don't realize the full importance of their own industry, how can one reasonably expect people outside the industry to understand it?

Have foundrymen ever considered promoting a nation-wide campaign of understanding about their industry? Just look what happened in the Victory Garden movement during World War II. The lowly gardener, who had been accepted as a matter of course for years, was quickly elevated through a national campaign to a respected position throughout the country. It's true that some ambitious wartime gardeners gave up before time to harvest. But the overall results were excellent.

Foundry Prestige Low

It seems to me that you "castings gardeners" have allowed your industry efforts to be taken as a matter of course, too. The prestige of the foundry—as a place to work—is possibly at all-time low. Too many foundries are still considered the fenced-in backyards of mass production. Large numbers of oldtimers who helped to pioneer the modern foundry industry have retired, or now are doing other types of work.

Foundry workers left in droves during World War II to do cleaner and less difficult work elsewhere at the same or less pay—and many have not returned. This happened in our own foundry. Most of the replacements seem to lack the capabilities of the oldtimers—and this, I believe, is one of the principal reason why we *think* we're working at or near capacity but really are not!

All of us will admit there's considerable basis for the foundry's low prestige. But I think foundrymen have permitted certain undesirable working conditions to be exaggerated—far out of proportion to the realities. Possibly, in some instances, you have added men when you should have added machines.

There's just as much dirt and perhaps hard work in steel, but the steelmen have done a pretty good job of glamourizing their industry.

Young men of the type we need, filled with misinformation, are turning up their noses at foundry jobs.

The foundry industry *must make itself attractive*—to capable workers elsewhere in our factories and to promising youngsters graduating from schools into industrial life.

But foundrymen will have to do a job on themselves before attempting to sell others on foundry work. I repeat: Too many foundrymen still don't realize the full importance and future of their own industry. You can't hope to succeed in selling others until you've sold yourselves first!

Now let's take a look at the importance of the foundry industry: We are dependent upon castings every day of our lives, from dawn to dusk. There's no industry which did not or does not involve castings. Ninety out of every 100 plants in the metal working industry use castings in the manufacture of their products.

Castings are integral parts of airplanes, railroads and other forms of transportation, just as they are in automobiles. Our foodstuffs involve thousands and thousands of castings—in their production, harvesting, preservation and distribution. Castings figure importantly in the clothes we wear. Water, gas, electricity, oil and coal are produced and transported with the aid of castings.

Many castings are finished products in themselves—such as car wheels, soil pipe, fire hydrants, manhole covers, the common radiator and the bathtub. The average five-room house contains over 4500 pounds of castings. I could discuss for hours the universal use of castings. After I had finished, you would say I hadn't told you anything new. That would be true, of course. You know all of these things, but do you *think* about them—about the big picture—and realize the full importance of your own industry?

Industry's Usefulness Grows

Castings are an art—not just a trade. Do you keep thinking about that? Just as important, does the public know it, too?

The production of castings is one of man's oldest industrial techniques, dating clear back to the fifth millenium before Christ. But the foundry industry has never become senile. Instead, it has grown increasingly useful—and important.

Forty years ago, a well-made casting might have had a tensile strength of about 25,000 psi. Between 1918 and 1941, the level increased to approximately 70,000 psi. During 1946, some commercial production reached 100,000 psi.

Fifty years ago, the gray iron industry had little knowledge of the complex materials being cast. Today, the gray iron industry has relatively great knowledge of its materials—and relatively great ability, therefore, to meet a wide range of requirements from simple weights to highly engineered castings, such as crankshafts.

Our 5000 foundries are spread out over every section of the country, with the heaviest concentration—of course—in the principal industrial areas.

Just consider the size of your industry!

According to Dun & Bradstreet, the foundry industry in 1946 had a market potential exceeding $7 billion, with a ferrous foundry potential of nearly $4 billion for that year.

You, in turn, are providing the manufacturers of equipment and miscellaneous suppliers with a $1 billion market. More than 60 per cent of all foundries are buying new equipment.

Do you ever stop to think that every foundry molder provides jobs for at least 60 other individuals? If you marketed your products direct to the consumer under trade brands, I'll bet this story would be widely known!

Yes—the foundry industry is among the most important of all basic industries—but foundrymen must sell themselves on this fact before they can hope to sell others.

Consider the Future

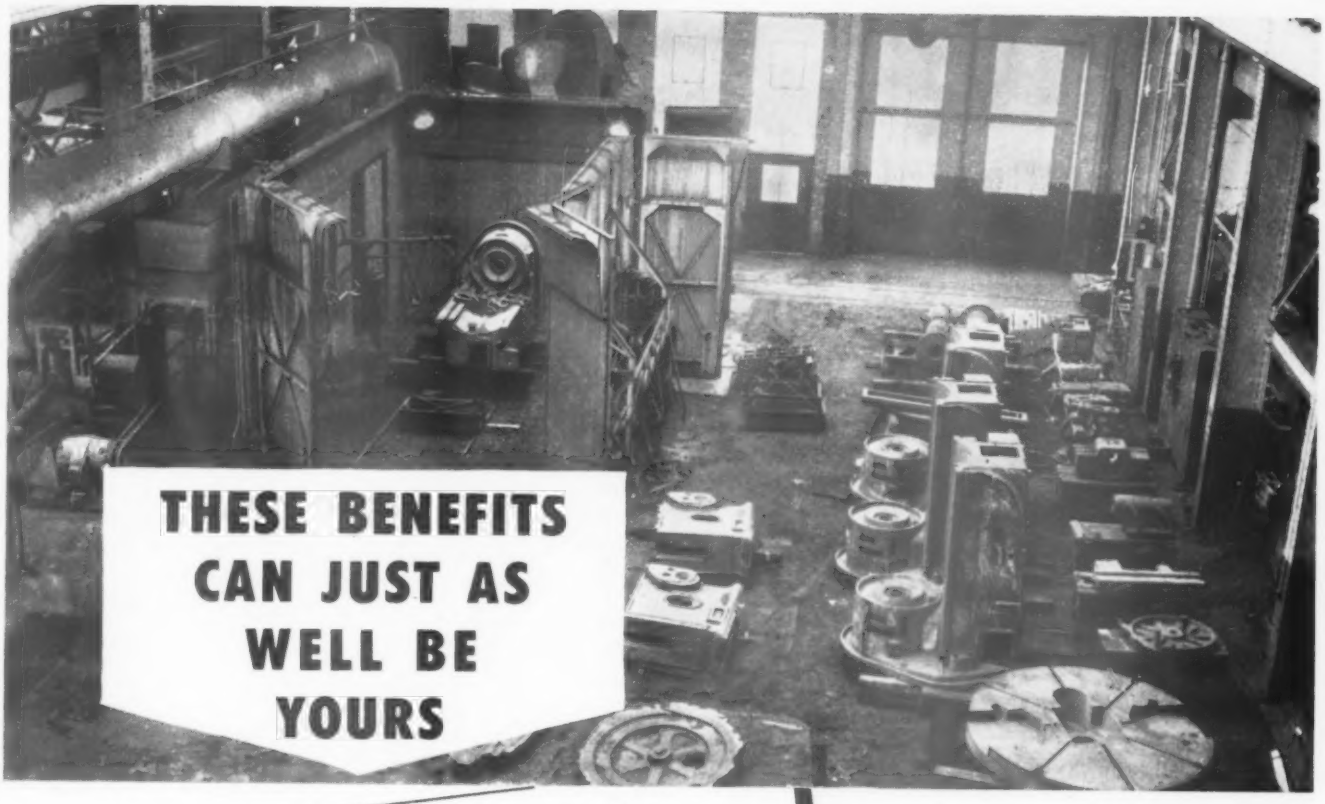
Now let's take a look at the future of the foundry industry. The mold for your future is in your own hands! Frankly, I don't know of any other industry having brighter prospects and greater opportunities for advancement. The foundry industry is constantly broadening—and thus creating new opportunities. There are fresh opportunities in foundry design and layout, in furnace practice, control of materials, metallurgy, laboratory facilities; in pattern and molding equipment, more efficient sand handling and mixing machinery; in cost control, good housekeeping and safety practice—in fact, in every phase of the foundry operation.

Full of unpredictables, the foundry industry is still a field without horizons—wide open for ingenuity and enterprise. Someday, you might even do away with sand! Who can say, with any degree of certainty, just what the future will bring?

The future of the foundry industry, in fact, depends largely on the kind of leadership we can find and develop. Good leaders attract and hold good workmen. We must emphasize to the young men coming out of schools into industry that they have a golden opportunity to get in on the ground floor of an expanding and improving foundry industry. We must drive home to them the fact that they have a better chance to succeed in the foundry than they have in many other places. If they seize the opportunity now, they'll be sitting pretty in the not too distant future.

The efficiency of our foundry operations will improve in direct proportion

(*Concluded on page* 163)



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Dear Sirs:

The Hydro-Blast recently installed in our foundry has proved itself to be a very valuable unit.

Unsolicited, our foundry employees have expressed their appreciation for the elimination of dust while the cleaning work is in progress. Added to this, of course, is the saving we have made in removing cores and cleaning castings, over the method previously used.

By conservative estimate of average times for different types and sizes of castings, we have reduced cleaning time 40 per cent; and for cleaning our 42" Planer Bed casting, we reduced the time 65 per cent. We feel sure that as our men become more familiar with the technique of operating the Hydro-Blast, greater savings will be made.

Yours very truly,
THE JOHN BERTRAM & SONS CO., Ltd.

N. J. Dinelaggo
Vice President and General Manager

. . . . . Nothing unusual about this—varying only in degree, it happens wherever and whenever Hydro-Blast is installed.

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ECONOMICAL
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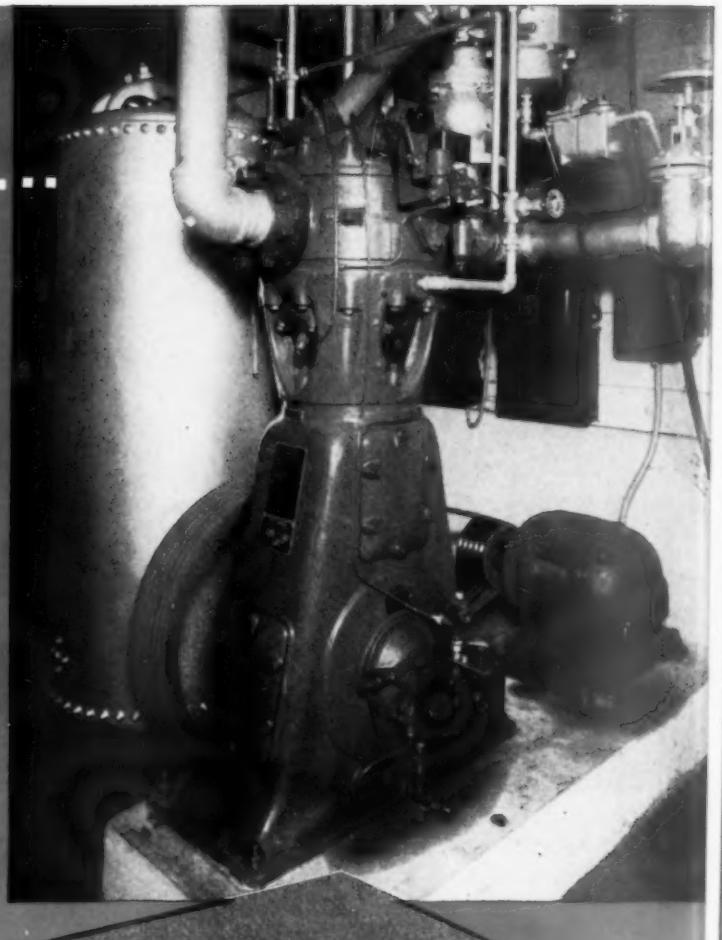

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AIR COMPRESSORS
1/4 TO 600 HORSEPOWER

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(*Concluded from page* 160)

to the number of higher type replacements we attract. But, to attract better replacements, foundrymen must clean up, redesign and mechanize at a much faster rate. I don't mean to say that a hospital operating-room atmosphere ever will be possible in the foundry. But no foundry need to be filthy. You must eliminate or minimize those conditions which have caused so many foundries to be considered the backyards of mass production.

Packing houses once were extremely undesirable places in which to work. The odors were terrible—much harder to bear than the dust in some of our foundries. Packing-house workers used to lug around heavy loads. But today, most packing houses have been cleaned up. Most of the odors have been eliminated. Employees work in white uniforms. Conveyors handle most of the loads.

Attract High Type Workers

Packing houses have become good places in which to work—and they have attracted higher types of personnel. I think it's true that the pressure of outside influences—interested in health and sanitation—have helped to bring about this condition in the packing industry. I believe it's also true that this is just around the corner in the foundry industry.

Any program of cleaning up, redesigning and mechanization is bound to take time, even at a much faster rate. We simply can't wait until all of these things have been accomplished before starting to sell others on the importance and future of the foundry industry.

The need for better replacements is immediate. It's urgent!

Foundrymen must go into the high schools and colleges, before clubs and all kinds of civic groups—everyone inside and outside the industry, in fact—and paint the true picture of conditions and opportunities in the foundry.

You must point out that foundries are for men who don't mind reasonable work and who enjoy challenge—at pay rates comparable with those for other types of work elsewhere in our factories, where competition is keener.

You should talk about and emphasize the bright sides of your jobs. You should explain that the dull, less desirable, sides are being eliminated or minimized. You should talk about the opportunities for expression of individuality; and how the foundry is one of the best places for an ambitious workman to land.

You foundrymen must demonstrate to your communities that foundries don't have to be civic liabilities. With the right kind of personnel, they can become civic assets. Many foundries already have.

There's a good example of what I'm talking about right here in Michigan. I have in mind a particular foundry which did such an outstanding job of making itself attractive that the community became proud of the foundry—and considered it a definite asset. The business grew, and the operator of the foundry decided to expand into another community.

The second community set up a howl as the news spread that a foundry might locate there. The opposition, in fact, became so loud and so strong that the operator gave up and returned to the first community. He told his friends, including the editor of the first community's newspaper, about his experience. That editor voluntarily went to the editor of the second community's newspaper and told him how valuable the foundry had become. The editor in the second community soon swung around to the point where the foundry was invited to locate there.

The proper type of personnel is no problem, once you've established your foundry as a good place in which to work. The right kind of people will flock to you. You must never forget that, in your individual communities, you always will be in competition with other industries for good men.

Your foundries contain many of these higher type people already, of course. But I think you should work on them, too. You should show them just how their particular work figures in the end product; show them the relationship between what they're doing and what others are doing all along the line.

In conclusion, please let me re-emphasize that the foundry industry probably will succeed steel as the principal bottleneck in the production of automobiles. You are going to be on the spot—more than ever. Therefore, you should take inventory as quickly as possible—and start doing something about the liabilities at once!

I repeat that the mold for your future is in your own hands.

There has been considerable talk about a bust, a recession, and adjustment, or whatever-you-may-call-it—toward the end of this year. It may come, of course. But it won't come if everyone resolves to do, and keep on doing, *a fair day's work for a fair day's pay!* I firmly believe that full production—and only full production—can prevent such a bust.

In these days of readjustments, we all have our problems. But being responsible for the foundry and machine shop operations in our own plant, I hope you foundrymen will call the bluff of the machine shop supervision!

Go ahead and core those holes so accurately that they don't need to be drilled! Cut the amount of finishing down to where you eliminate half of the mills! Center the casing so uniformly that you do away with the locating operations.

In doing this, you will increase your relative importance and size.

I wish you good luck—for our mutual benefits.

VETERAN: Franklin G. Smith (left), president, the Osborn Mfg. Co., Cleveland, has presented more than 100 watches to company employees on their attaining 20 years of service with the company. At a recent meeting of the 20-Year Club C. W. Titgemeyer (right), president of the club, reciprocated by presented a watch to Mr. Smith, the first he has received during the 55 years he has headed the company

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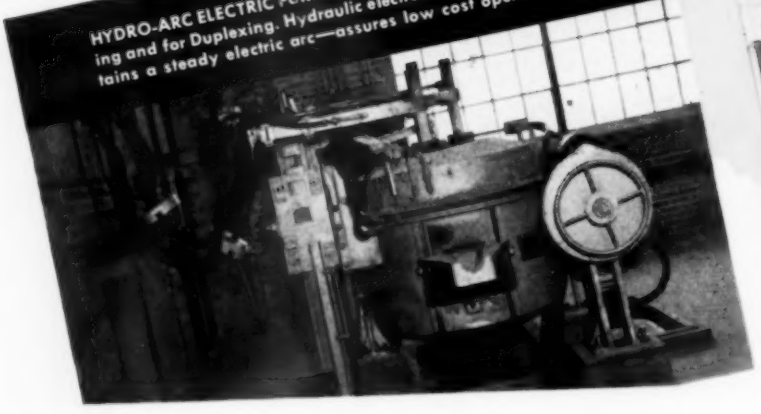
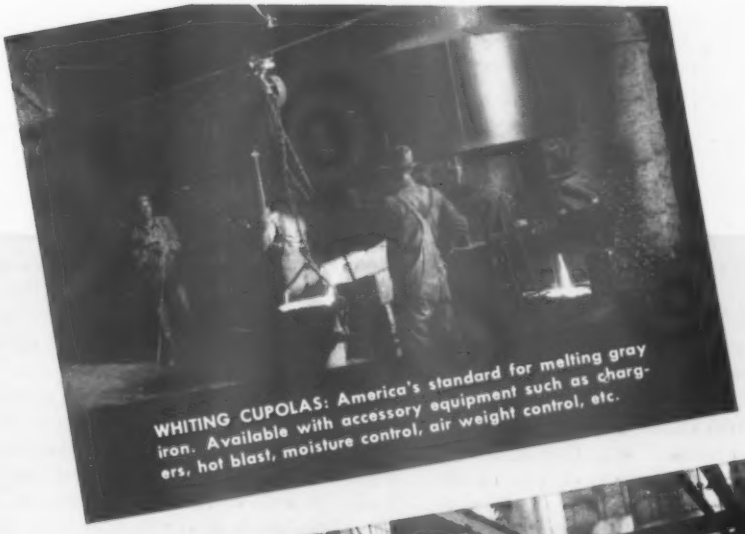
CRADLE FURNACES: For homogeneous super-heated metal. Usually supplied with pulverized coal firing, but may employ oil. Recommended chiefly as a holding furnace for continuous supply of hot, uniform metal.



HYDRO-ARC ELECTRIC FURNACES: Used both for direct melting and for Duplexing. Hydraulic electrode positioning maintains a steady electric arc—assures low cost operation.

ROTARY FURNACES: Used in the production of malleable iron and high strength grey iron. Its advantages include close metallurgical control, fast melting, high temperature, and lower cost of fuel and charge.



WHITING CUPOLAS: America's standard for melting gray iron. Available with accessory equipment such as chargers, hot blast, moisture control, air weight control, etc.

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DUPLEXING EQUIPMENT: Melting units can be synchronized to give a continuous supply of hot metal. Typical combinations: cupola-air furnace; cupola-electric furnace; cupola-converter; cupola-open hearth; and others.

There are advantages—and limitations—to every type of equipment that can be used for ferrous metal melting.

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Activities of Foundry GROUPS

Rochester

AT THE April 8 meeting of the Rochester Chapter of the AFA, Pat Dwyer, Engineering Editor, THE FOUNDRY, appeared as guest speaker. In his address entitled, "The Foundry—Past and Present," Mr. Dwyer traced the growth and progress of this oldest of industries through the years. Thousands of years ago, working without equipment, facilities and controls (as we know them today), the ancients produced some outstanding examples of the metal founding art,—in fact some masterpieces have never been surpassed in quality. Specimens of art bronze, dating back to ancient China, are to be seen in museums today, and their beauty and intricacy would tax the ability of modern metal founders.

The speaker stated that it is logical that the earliest metal forms were forged to shape from metal in a plastic condition. Later, the development of crude furnaces for producing liquid metal opened a much broader field to artists and sculptors, and the early castings were poured into crude molds formed of available local materials. The years that followed saw a gradual improvement in melting methods. Development of better melting equipment, more suitable fuels, and the consequent production of hotter and longer-lived metal, permitted still greater flexibility in casting production, and opened up a tremendous new field.

Invention of the cupola was a step forward, and even today this melting unit continues to produce enormous tonnages of iron economically. Although basically the same, many refinements have been made in cupola design. Early introduction of bottom doors, improvement in refractory materials, better blower equipment, improved tuyeres, and blast control, have added to the wide application of this method of producing quality cast iron.

Particularly within the last hundred years the industry has made great advances, and has kept abreast of modern requirements, said Mr. Dwyer. Heavy demands of the railroad industry, and more recently the automotive and aircraft industries, have led to refinements in cast iron and steel production that were undreamed of a century ago. Development of the open-hearth furnace, the converter, and finally the electric furnace, and the knowledge of various heat treatments, have all played a definite part in advancement of the industry. With all of this technical knowledge there has been an equally rapid advancement in foundry equipment, handling, and transportation.

No speaker is better qualified than Pat Dwyer to review the history of the foundry industry. His long and colorful experience in all phases of operation, his acquaintance with outstanding figures in the field, and his travels around the country, have given him a broad and interesting knowledge of the entire industry. Added to this, his ever-present keen sense of humor makes him a welcome speaker before any group.—*Don Webster.*

EASTERN CANADA-NEWFOUNDLAND CHAPTER: Entertainment committee members in charge of the Stag Night meeting of Eastern Canada-Newfoundland Chapter, Apr. 18. Seated, left to right—L. Beaudry; L. Guillemette; J. Shewan, chairman; R. E. Cameron. Standing left to right—A. Cartwright, P. Savoie, E. Gervais, A. Hughes, L. Voisard, E. Laurendeau, J. Moore and J. Newman.

Philadelphia

F W. HANSON, metallurgist, Electro Metallurgical Co., New York, addressed the Philadelphia Chapter of the AFA at its regular meeting at the Engineers' Club, Philadelphia, April 11. His subject was "Conservation of Alloys in Steel Manufacture." Because iron foundry attendance outnumbered steel, Mr. Hanson spoke on the same subject in relation to iron casting production.

He covered the subject in a masterful manner, pointing out how the producer can obtain maximum advantages of alloying elements present in scrap and how the greatest economy may be expected by obtaining additional alloys to meet rigid specifications. He also made some suggestions in reference to the economical production of quality castings of various analyses.

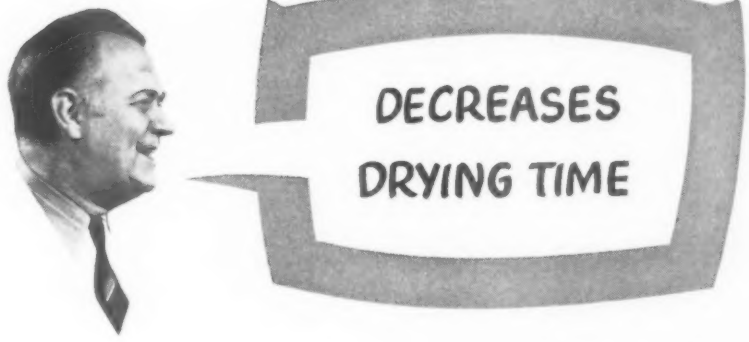
Chairman B. A. Miller announced the election of E. C. Troy, Dodge Steel Co., to serve as chairman for next year and C. L. Lane, Florence Pipe & Machine Co., as vice chairman, with perennial Bill Coleman acting as secretary-treasurer. —*H. V. Witherington.*

Central New York

NINETY members and guests of Central New York Chapter of the AFA attended the April 11 meeting in the Onondaga Hotel, Syracuse, N. Y. A. L. Kress, prominent industrial engineer and author of the book *Foremanship Fundamentals,* addressed the group on "Human Relations In Industry."

Some of the fundamental principles that are necessary for good industrial relations, as presented by Mr. Kress, are: 1. A sound company policy understood by all who are in a supervisory capacity. 2. Recognition of employees as human individuals rather than clock numbers. 3. Personal contact with those under the supervisor's jurisdiction. 4. A thorough knowledge of the operations controlled by a supervisor so that he may command the respect of those under him. 5. Recognition of a job that is well done. 6. No favoritism. 7. An explanation to each em-

(*Continued on page* 168)



Foundry management, watching mounting costs, sees profits in MOGUL. This perfect Green Bond makes money because it decreases drying time, yields smooth cores and reduces discards. MOGUL works profitably with pitch or resin because cores can be handled warm. For both green and dry strength use MOGUL in cores.

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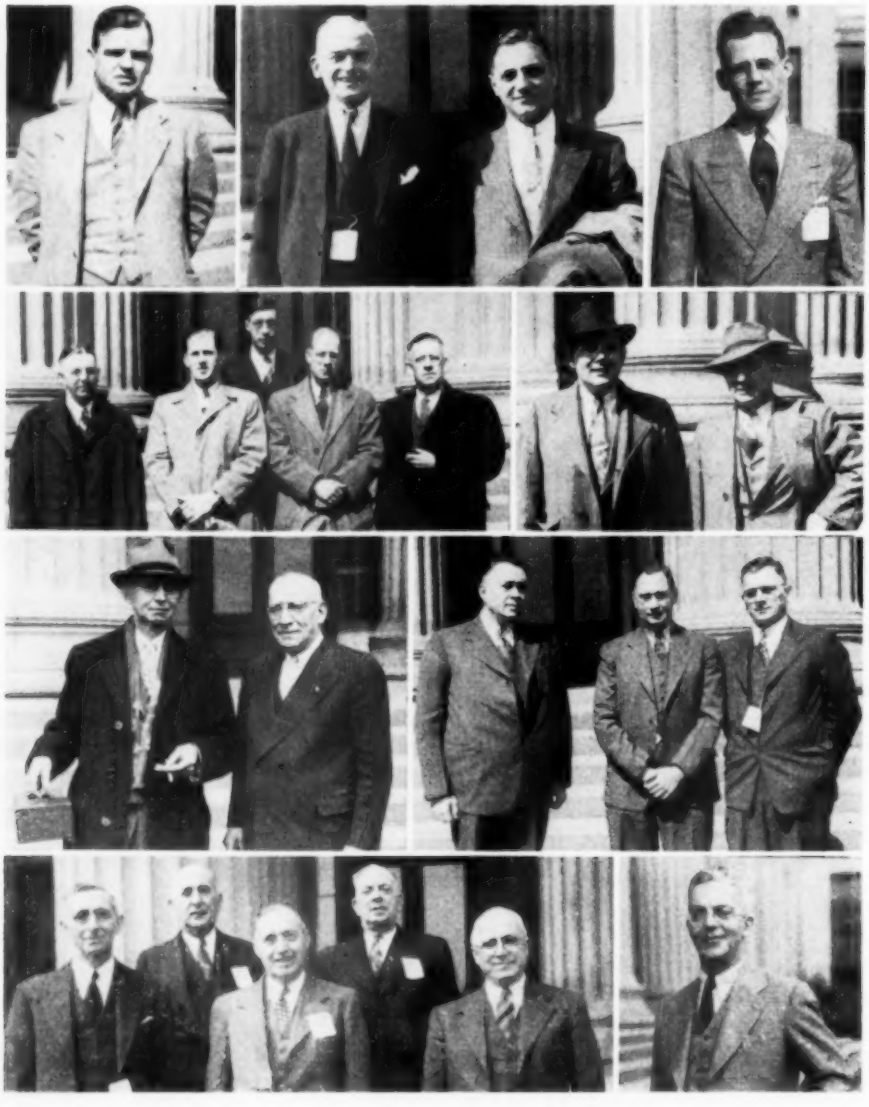
Some of the New England foundrymen at their recent regional conference. Photos courtesy of C. A. Wyatt, Devevoise-Anderson Co., Boston



(*Continued from page* 166)

ployee of his position on the production team. 8. Understanding of the employee's problems. 9. Supervisors and foremen should not carry their personal feelings into the job.—*J. A. Feola, chapter reporter.*

New England

DR. MICHAEL B. BEVER, assistant professor of metallurgy, Massachusetts Institute of Technology, discussed the role of gases in cast metals, at the April meeting of the New England Foundrymen's Association. Dr. Bever outlined the general principles governing the solubility of gases in metals, and explained the effects of metal temperature, gas pressure and time of exposure on the absorption of gases. Differences between simple gases, such as hydrogen and nitrogen, and the compound gases, water vapor and carbon monoxide, were indicated.

The speaker suggested that hydrogen be considered as the most likely suspect if evidence of gas occurs in production of ordinary castings. He emphasized the fact that metals may absorb hydrogen from water vapor, sources of which are manifold and include rust on scrap, products of combustion in open-flame melting, condensed moisture and ladles that have not been dried sufficiently. Dr. Bever discussed the various types of porosity found in light metals and the procedures for preventing gas unsoundness in them. It was shown that behavior of gases in copper-base alloys, although somewhat complex, can be controlled. Finally, the role of gases in steel and cast iron was considered from the standpoint of the foundry metallurgist.

During the discussion period various related points were touched upon, such as the effect of gases on segregation. The importance of moisture as a potential source of gas unsoundness was further illustrated.—*Merton A. Hosmer.*

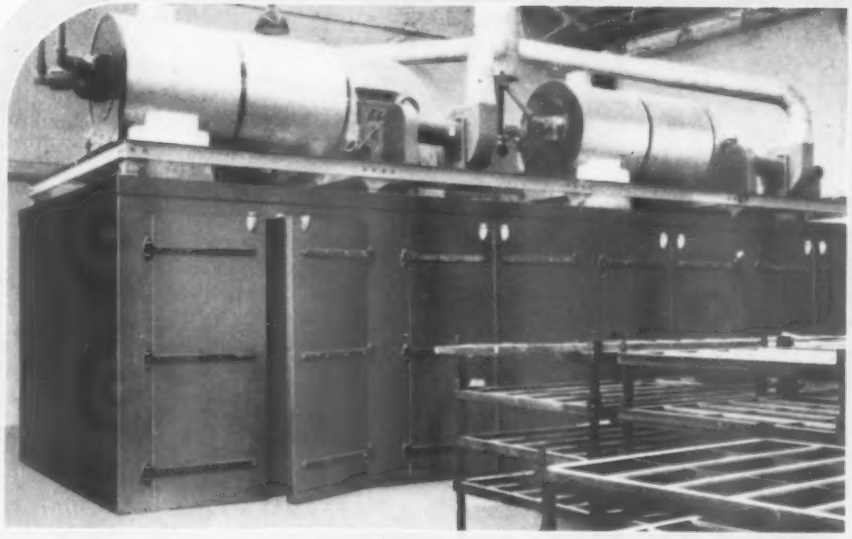
Cincinnati

CINCINNATI District Chapter of the AFA held its April 14 meeting at Anthony Wayne Hotel, Hamilton, O. This was the first time the chapter held a meeting out of Cincinnati in quite some time and 135 were present for the dinner and program.

L. P. Robinson, Werner G. Smith Co., addressed the group on "What's New in the Coreroom." Mr. Robinson gave a straight-forward and interesting talk which was centered on the problem of costs. He stated that it is possible for foundrymen to be too close to the job to see exactly what might be wrong with coreroom practice and that they are some-

(*Continued on page* 170)

LANLY *Dual Fuel* OVENS



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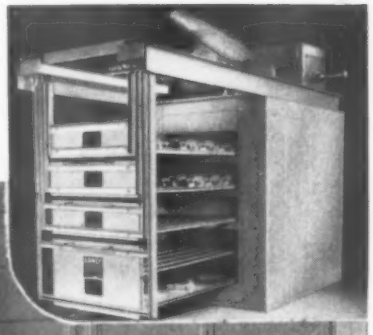

A typical Lanly car type mold drying oven. Each compartment is individually heated and controlled.

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(*Continued from page* 168)
times stubborn as to their loyalty to old ideas which can be expensive and inefficient.

He discussed ways of using cereal binders, sand and moisture and problems in baking, permeability, venting and other practices. His suggestions were to the point and applicable.—*E. F. Kindinger, secretary.*

St. Louis

ATTENDANCE at the Apr. 10 meeting of the St. Louis District Chapter of the AFA did not equal advance reservations but in spite of cold weather and heavy rain 100 foundrymen attended. Walter Zeis, chairman of the membership committee, reported that chapter membership was the highest in its history. It developed during the recognition period that Harry Brigget, a fellow foundryman from Australia, was a guest. Mr. Brigget, who is visiting steel companies in the United States, gave an interesting account of his trip to this country via air lines.

Tom Ross, chairman of the apprentice training committee, introduced the winners in the preconvention apprentice competition and presented them with checks in appreciation of their efforts. Winners were as follows: Nick Di Carlo, Scullin Steel Co.; Oliver J. Korte, Hoeflin Pattern Co.; Moriel G. Hecht, American Car & Foundry Co.; Curtis Tucker, Fulton Iron Works; Martin J. Foeller, Remmers Pattern Co.; Eugene Kroeger, Scullin Steel Co.; Eugene Kaetzel, Central Pattern Co.; and Alfred M. Sandweg, Missouri Pattern Works.

Frank Kiper, Ohio Steel Foundry Co., Lima, was guest speaker and illustrated his discussion of "Steel Castings Specifications," with slides. Mr. Kiper outlined details of specifications set up for steel castings, pointing out not only metallurgical problems but the importance of physical properties. Importance of the right specification and relationship of specifications to the final result in steel castings production, were emphasized. Question and answer period followed the talk.

Chairman Roland Leisk presided at the business meeting and John Williamson, chairman of the nominating committee, presented the names of the following, who were subsequently elected to serve as officers for the 1947-48 season: Chairman, Norman L. Peukert, Carondelet Foundry Co.; vice chairman, Al Hunt, National Bearing Metals Corp.; secretary, Paul E. Retzlaff, Busch-Sulzer Bros. Diesel Engine Co.; treasurer, Henry W. Meyer, General Steel Castings Co.

New directors elected include: Roland Leisk, American Steel Foundries; Robert E. Woods, M. W. Warren Coke Co.; William Burgdorfer, Missouri Pattern Co.; and George Shepherd, Duncan Foundry Corp.—*John W. Kelin.*

CENTRAL ILLINOIS: Speaker at the joint meeting of Central Illinois Chapter of the AFA and Peoria Chapter of the American Society for Metals, Apr. 7, was V. A. Crosby, Climax Molybdenum Co., Detroit, shown holding slide. Seated next to him is F. W. Shipley, Caterpillar Tractor Co., Peoria, Ill., Central Illinois Chapter program chairman. Standing, left to right, are Zigmond Madacey, Central Illinois Chapter chairman and T. M. Logan, vice chairman, Peoria Chapter of the ASM, both of Caterpillar Tractor Co. Photo courtesy of Caterpillar Tractor Co.

Central Illinois

CENTRAL Illinois Chapter of the AFA held a joint meeting with Peoria Chapter, American Society for Metals at Jefferson Hotel, Peoria, Ill., April 7. V. A. Crosby, Climax Molybdenum Co., Detroit, spoke on "Factors Affecting the Physical Properties of Gray Iron."

With the use of slides, Mr. Crosby illustrated the more important points of his discussion. The statistical graphs that he had prepared during his years of experience were helpful in showing the gradual improvement in the structure of gray iron principally through additions of alloys.

It was brought out that in many cases where gray iron had failed as the proper material for a casting the failure could be traced back to improper design and through the relief of stresses in the design, gray iron could still be used with good results.—*G. H. Rockwell, secretary.*

Wisconsin

AFTER the Wisconsin Chapter of the AFA dinner meeting April 11 at Crystal Ballroom, Schroeder Hotel, Milwaukee, the usual sectional meetings were held in the hotel's meeting rooms.

The joint gray iron and malleable iron groups heard William J. Hebard, personnel director, Continental Foundry & Machine Co., East Chicago, Ind., speak on "Human Relations and Handling of Men in the Foundry." J. V. Olle, Motor Castings Co., Milwaukee, in introducing the speaker, said that Mr. Hebard has had about 27 years experience in personnel work. In his talk, Mr. Hebard set forth some of the latest developments in foundry personnel management.

R. A. Quadt, research metallurgist of Federated Metals Division, American Smelting & Refining Co., addressed the nonferrous groups. Kasmir Kotowitcz, Ampco Metals Inc., Milwaukee, was chairman of this meeting.

Mr. Quadt's subject was "Common Foundry Problems in Aluminum Castings." He described modern techniques in the preparation of the metal in its molten condition, actual casting procedure and satisfactory production of molds.

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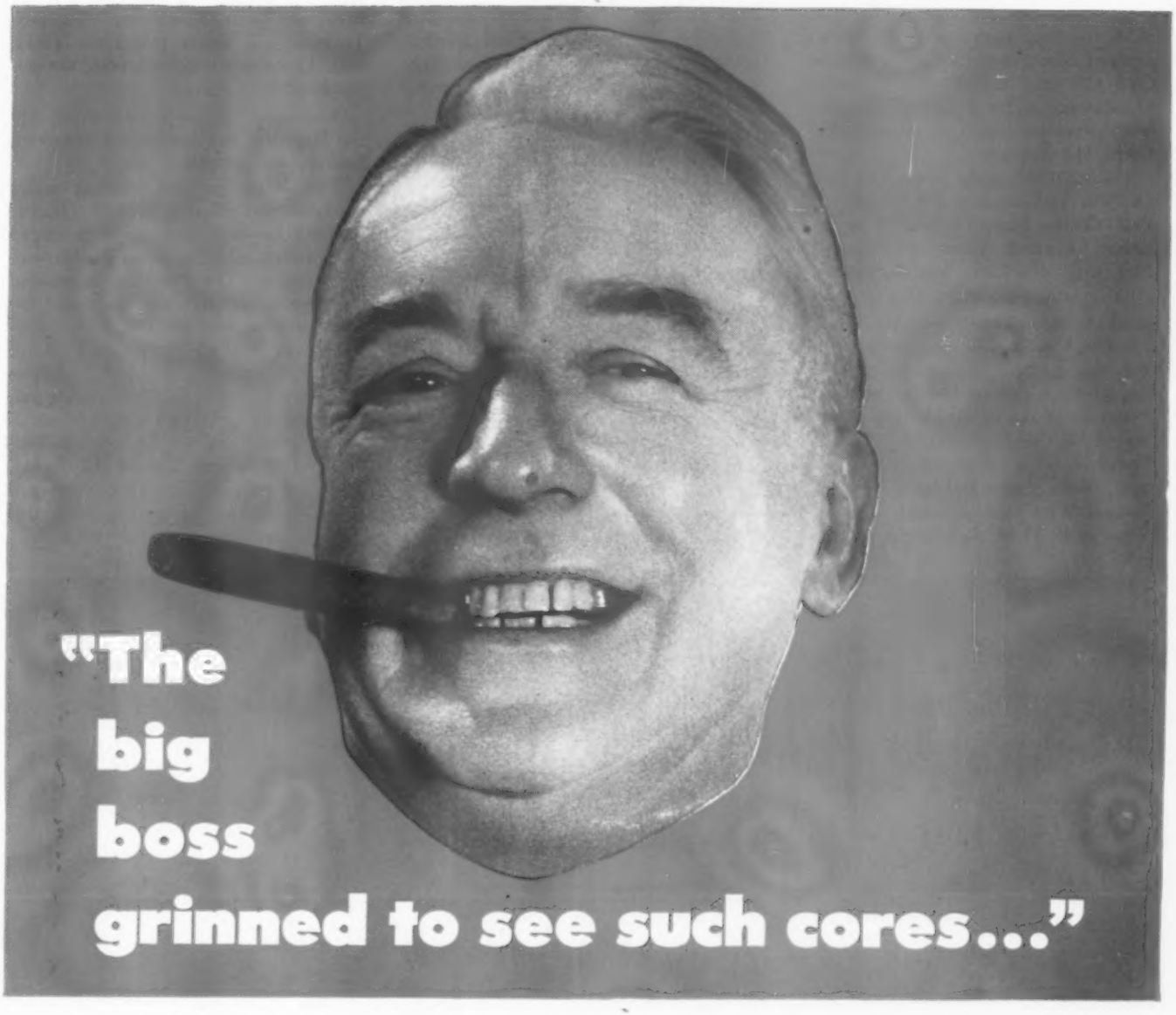

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(*Continued from page* 170)

At the steel meeting, W. W. Moore, superintendent, Burnside Steel Foundry Co., Chicago, talked on "Preventive Maintenance in the Foundry." Chairman at this meeting was S. E. Mueller, Falk Corp., Milwaukee.

The technical group listened to a talk on "The Technician in the Foundry" by Prof. George Barker, University of Wisconsin. Kenneth Geist, Allis-Chalmers Mfg. Co., Milwaukee, was chairman.

M. C. Frankard, Delta Mfg. Co., Milwaukee, showed a technicolor film on "Lumber" before the pattern group. At this meeting copper patterns were on display for inspection by the members.

Results of the recent election of chapter officers were announced. They are: President, R. J. Anderson, works manager, Belle City Malleable Iron Co., Racine, Wis.; vice president, Robert C. Woodward, chief metallurgist, Bucyrus-Erie Co., South Milwaukee; treasurer, Richard F. Jordan, vice president, Sterling Wheelbarrow Co., Milwaukee; secretary, Arthur C. Haack, vice president, Wisconsin Gray Iron Co., Milwaukee.

New directors for terms ending in 1950 are: Walter Edens, metallurgist, Ampco Metal Inc.; Albert F. Pfeiffer, assistant general superintendent, Allis-Chalmers Mfg. Co. and Joseph G. Risney, president, Risney Foundry Equipment Co., Milwaukee.—*John Hubel.*

• • •

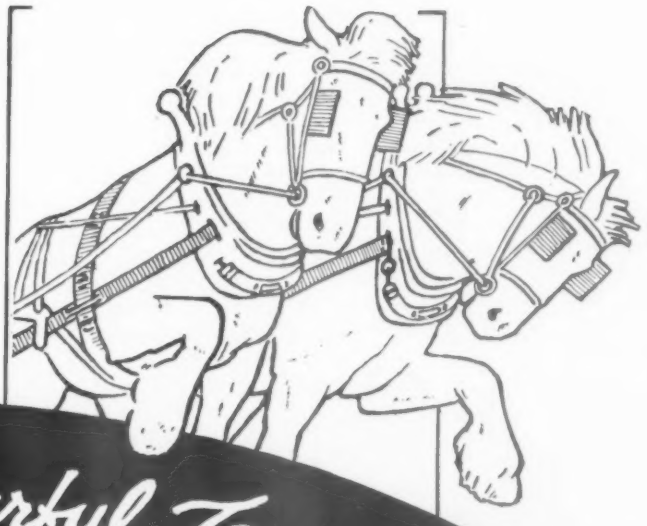
Recognition night for Old Timers and Apprentices was held by Wisconsin Chapter, AFA at the Hotel Schroeder, Milwaukee on May 9, with 450 attending, of which 73 were oldsters (50 years or more in the foundry business) and 98 apprentices. Each year at such a special dinner meeting, new old timers are initiated and given plaques, while the contest winners among the apprentices are given certificates. This year 11 more old timers joined the ranks, with 12 contest winners among the apprentices.

Attendance at this special event was the largest of any similar meetings ever held by the chapter.

This being the last meeting under the direction of the 1946-47 officers, Retiring President Zuege was presented with a ring, as is the usual custom with this chapter. The president announced the results of the election, and the new officers for 1947-48 were introduced as follows: President, R. J. Anderson, works manager, Belle Malleable Iron Co., Racine, Wis.; vice president, Robert C. Woodward, chief metallurgist, Bucyrus-Erie Co., South Milwaukee; treasurer, Richard F. Jordan, vice president, Sterling Wheelbarrow Co., Milwaukee (who has held that

(*Continued on page* 174)

SOUTHERN CALIFORNIA: Some of the participants in the Apr. 4 meeting of the Southern California Chapter, AFA



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20th CENTURY BLAST · SHOT ★ GRIT ·

(*Continued from page* 172)

position for the last eight years); secretary, Arthur C. Haack, vice president, Wisconsin Grey Iron Co., Milwaukee. Three new directors, for terms expiring in 1950, were named as follows: Walter Edens, metallurgist, Ampco Metal Inc.; Albert F. Pfeiffer, assistant general superintendent; Allis-Chalmers Mfg. Co., and Joseph G. Risney, president, Risney Foundry Equipment Co.

It was announced that all of the changes in the chapter's by-laws, on which the members had voted last month, had been adopted.

After taking the gavel, the new president said a few words to the members, expressing the hope that the same cooperation would be shown in the coming year as that which had characterized the past regime. He announced that an old casting, typical of the kind of work turned out by foundries of Wisconsin in 1890, was on exhibit in the foyer of the hotel and many of those present were interested to look at this old sample.

Records of the chapter show some of the oldest veterans in point of service, are the following: A. J. Anderson, started in foundry at Hjarring, Norway, in 1880, now working at Bucyrus-Erie foundry, South Milwaukee; A. E. Harrison, 1881, E. P. Allis Co. (now Allis-Chalmers). Milwaukee, and still with that company; E. M. Gladfelter, 1882, at a Baltimore foundry, now with Bucyrus Erie Co., South Milwaukee. Following four men started in foundry business in 1883: George Geiger, E. P. Allis Co., and still with that company; Robert Kreucke, Thomas Brass & Iron Co., now with Production Pattern Co., Milwaukee; Daniel Roney, A. Lietelt Co., now with Nordberg Co., Milwaukee; George Haberkorn, Thomas, Bagley & Wentworth, now retired.

After the business session, a floor show concluded an enjoyable evening.—*John E. Hubel.*

Central Ohio

DISCUSSION of the use of chemically coated sand for green sand molding aroused considerable interest at the March 24 meeting of the Central Ohio Chapter of the AFA. Although the subject for the meeting was announced as "Precision Casting," inability of the scheduled speaker to make the necessary transportation connections prevented him from appearing.

In his absence Norman Dunbeck, vice-president of Eastern Clay Products Inc. and chapter chairman, talked on chemically coated sands. Mr. Dunbeck pointed out that although chemically coated sands are more expensive than the sands replaced, the increase in cost is more than offset by decreased cleaning costs and increased production. The latter comes about through improved flowability of the sand, thereby decreasing molding time.

Cost figures were given showing the advantages realized at the first commercial application at Lynchburg Foundry Co., Lynchburg, Va. Mr. Dunbeck went on to say that aside from increased ease of cleaning and production, defects due to sand are greatly reduced. The entire subject of chemically coated sands appears to be the opening of a new era in green sand practice, which might well upset many of our perconceived notions of the behavior of molding sand.—*D. E. Krause, chapter reporter.*

Chicago

CHICAGO CHAPTER of the AFA brought its 1946-47 year of activities to a successful conclusion, May 5, at its regular dinner meeting and annual business session at the Chicago Bar Association. Approximately 135 members and guests attended.

Chapter President L. H. Hahn, metallurgical supervisor, Siyver Steel Casting Co., Chicago, presided at the business portion of the meeting, and in the absence of the chairman of the membership committee, Deming H. Lucas, territorial representative, Delhi Foundry Sand Co., reported the membership total of the chapter as 804. He also announced that no additional nominations for 1947-48 chapter officers had been received, whereupon he entertained a motion for acceptance of the nominating committee's recommendations reported at the April meeting.

Mr. Hahn then introduced the new officers as follows: President, Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago; vice president, Chester K. Faunt, works manager, Christensen & Olsen Foundry Co., Chicago; and secretary, Victor Rowell, sales technician, Velsicol Corp., Chicago. The office of treasurer, now occupied by Bruce L. Simpson, president, National Engineering Co., Chicago, is appointive by the board of directors.

The new directors for three years include Retiring President Hahn; George W. Anselman, service engineer, Geobig Mineral Supply Co., Chicago; W. B. George, foundry engineer, R. Lavin & Sons Inc., Chicago; and Robert M. Jones, superintendent of foundries, South Works, Carnegie-Illinois Steel Corp., Chicago.

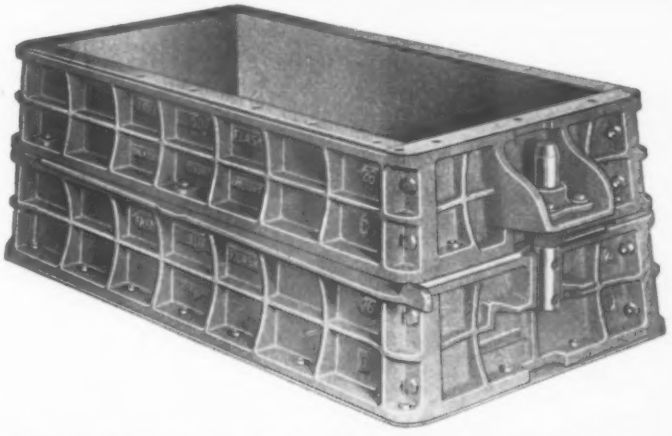
(*Continued on page* 178)

CENTRAL OHIO: Informal scenes at the Mar. 24 meeting of the Central Ohio Chapter, AFA, at Columbus. Photos by Wilfred H. White, Jackson Iron & Steel Co.

Cast Iron

JACKETS

Are Best by Test



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ACCURATE.

STURDY...

LIGHT.....

BUILT FOR LONG SERVICE AND FAST PRODUCTION

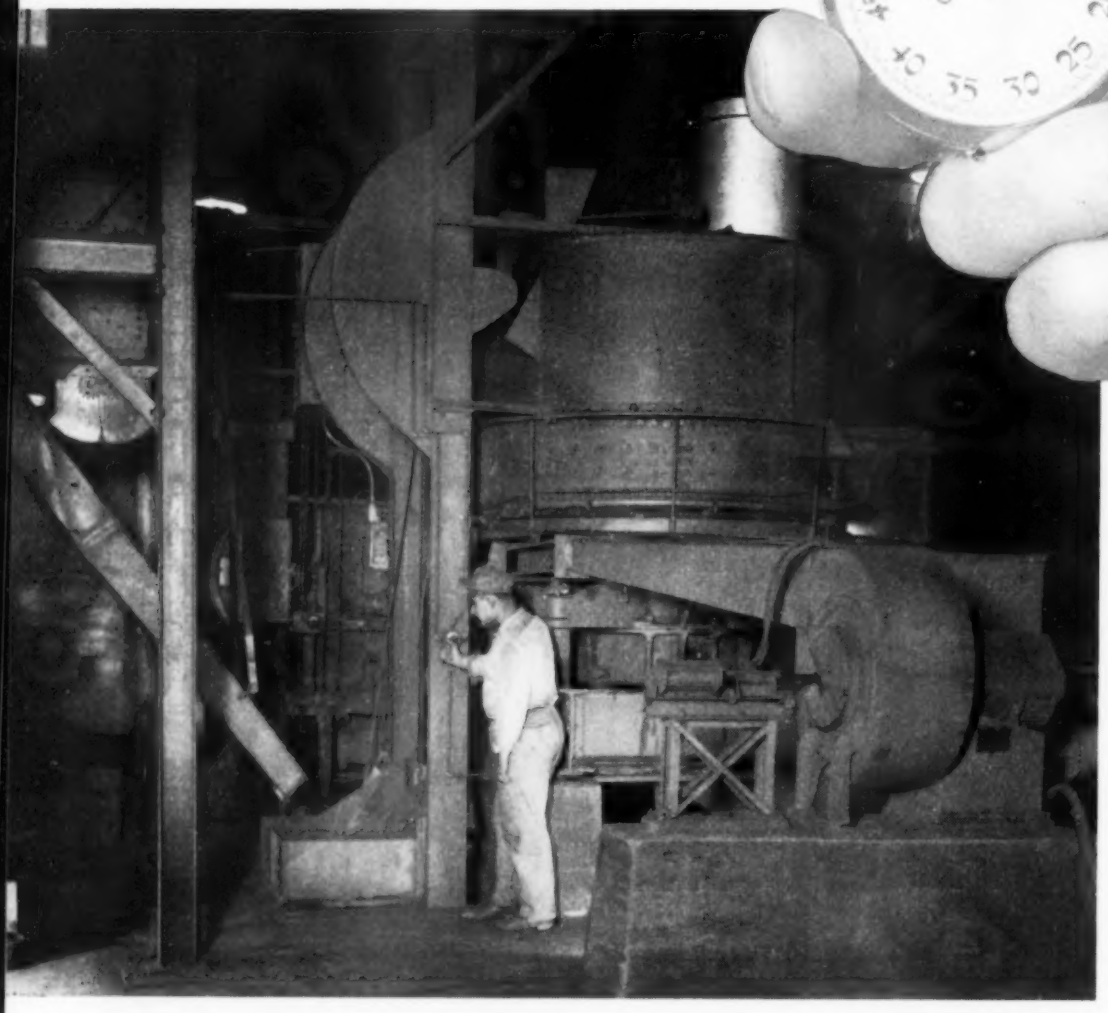
GROOVLOCK

THE FOOL-PROOF PIN

THE FREMONT FLASK CO.
Fremont, Ohio

MULLING CYCLE...1½ MIN.

• • • *fast, thorough MULLING plus COOLING in 1½ minute cycles . . . that's Speedmullor performance!*



An Interesting Study of Foundry Operations at *NATIONAL TRANSIT PUMP & MACHINE CO.*, Oil City. Pa.

A condensation of an article from The Beardsley & Piper Co.'s "Better Methods"

National Transit's Speedmullor is equipped with air cooling — actually cooling hot sand as it mulls — doing the entire job in an extremely short cycle and doing it more thoroughly and efficiently than by any other method.

THAT'S right . . . a batch of completely mulled sand every 1½ minutes from this Speedmullor at National Transit Pump & Machine Co.! And that time *includes cooling.*

National Transit's No. 70 Speedmullor has a batch capacity of 15 cu. ft. Equipped with skip hoist for fast loading, it also has mechanical controls for batch weighing, measuring and discharging.

In this foundry as in many others, most of the sand as returned from the shake-out is *hot* when it reaches the Speedmullor. Because the Speedmullor is equipped with air cooling, the hot sand is brought down to within 5 or 10

(Continued on next page)

The Speedmullor discharges mulled sand onto conveyor belt, taking it direct to Speedslinger's portable hopper.

This Motive Speedslinger quickly rams various size molds for National Transit — saving them time and money.

MULLING CYCLE . . . 1½ MIN.

(Continued from previous page)

degrees of room temperature in 1½ minutes. It does this cooling *while mulling*. The Speedmullor is the *only mullor* in which air is blown *through the mass of sand as it mulls.*

SPEEDMULLOR MULLED SAND IS SUPERIOR IN QUALITY

In tests made by a number of users it has been actually proven that the quality of the sand mulled in the Speedmullor is superior in permeability and strength to that produced in any other mills, even though the mulling cycle in other mills may be at least 5 to 10 minutes longer. In other words, mulling for long periods of time is not necessary in order to produce high quality sand. The Speedmullor kneads and aerates the sand between resilient rubber surfaces, giving a complete and thorough action that accomplishes the utmost in mulling in a fraction of the time required by other mullors.

SAVINGS MADE IN CORE SAND MULLING

Core sand at National Transit is mulled in a No. 40 Speedmullor with a batch capacity of 5 cu. ft. Five different kinds of core sand are used and the average mulling time per batch is about 2 minutes. They formerly used a paddle type mixer and its mulling cycle was about 12 minutes. This Speedmullor has saved considerably on core oils and produces a much better quality sand for cores.

WRITE FOR COMPLETE INFORMATION ON THE SPEEDMULLOR

The Beardsley & Piper Company, 2424 N. Cicero Avenue, Chicago 39, Illinois.

National Transit's core sand Speedmullor saves considerably on core oils and binders.

The Greatest Advancement in Mulling Procedure

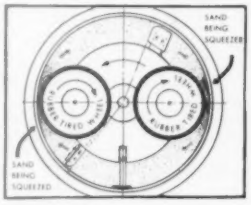
Speedmullor Mulls Sand to Its Maximum Physical Properties 4½ Times Faster Than Any Other Mullor

Performance records prove that the Speedmullor quickly and thoroughly mulls sand at the lowest cost per pound — *including maintenance.*

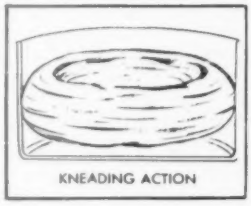
The Speedmullor is the *only mullor* that: (1) mulls sand between rubber, avoiding break-down of sand grains (2) guarantees positive turning of mullor wheels with proper mulling pressure applied (3) aerates the sand inside the mullor *as it mulls* (4) cools sand by the passing of air *through* it *as it mulls* (5) removes fines to a controlled degree (6) thoroughly discharges the entire batch in 6 to 8 seconds.

SPEEDMULLOR ACTION

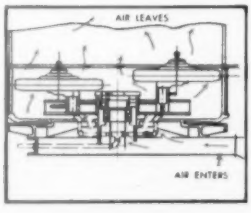
1 *Speedmullor squeezes and kneads the sand between resilient rubber surfaces which last indefinitely because of their resistance to abrasive action.*



2 *Speedmullor disperses the sand—holds it in suspension as it kneads and agitates . . . separating the grains and avoiding compact masses.*


KNEADING ACTION

3 *Air entering Speedmullor at bottom is forced through suspended sand, quickly cooling it to within a few degrees of room temperature.*



The Speedmullor method is the greatest advancement in mulling. Hundreds of foundries, large and small, are using Speedmullors. How do they like them? Just ask a foundry that uses a Speedmullor — or a company that uses 14 Speedmullors in its 3 foundries. We will give you names upon request.

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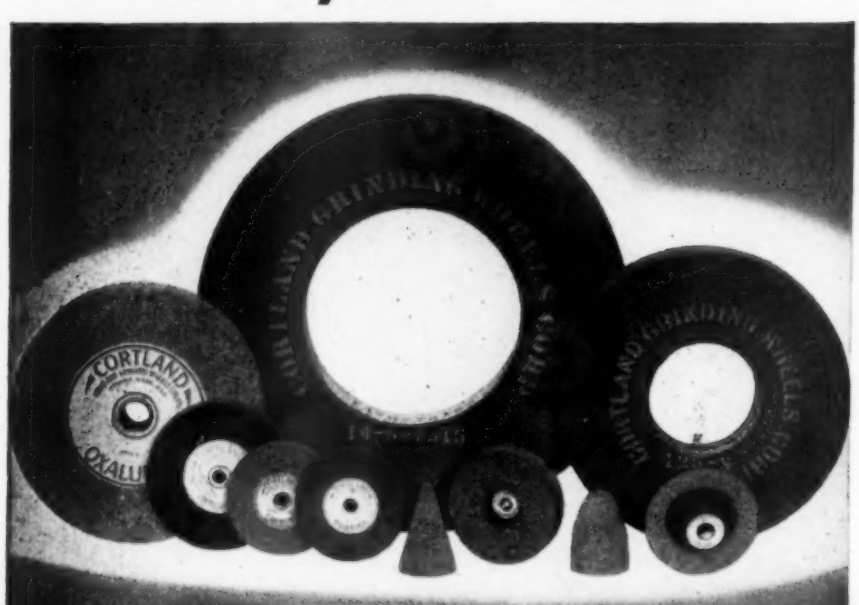
SPEEDMULLOR

The Foundryman's Choice . . .



Cortland Snagging Wheels

It's a safe bet that Cortland has exactly the one you need, for the Cortland line includes Snagging Wheels in all sizes — all types. Mount them on floor stands or swing frames — or use them on portable grinders — you'll get rapid stock removal — longer wheel life — cooler grinding action on all types of castings, if you follow the recommendations of Cortland Engineers.

The Cortland policy is one of suiting the wheel to the job and its engineering and production facilities stand ready to work with you to that end.

Write freely about your problems to

CORTLAND GRINDING WHEELS CORP.
6 Cortland Street
Chester Mass.

For Better Snagging

CORTLAND

(*Continued from page* 174)

Technical portion of the meeting consisted of four roundtable sessions of the Gray Iron, Malleable, Nonferrous and Steel divisions.

President-elect Skeates served as chairman of the Gray Iron division meeting at which Roy W. Schroeder, foundry instructor, Washburne Trade School, and Navy Pier branch, University of Illinois, Chicago, spoke on "Core Molding."

"Some Factors in Annealing Malleable Castings" was the subject discussed by W. D. McMillan, metallurgist, International Harvester Co. Chicago, at the Malleable roundtable. Paul Skirha Jr., foreman, malleable foundry, Crane Co., Chicago, served as chairman.

Martin G. Dietl, nonferrous metallurgist, Crane Co., Chicago, addressed the Nonferrous group session on "Melting Furnace Operations in the Brass Foundry." H. E. Ferguson, sales engineer, Acme Aluminum Foundry Co., Chicago, was chairman.

For the Steel division roundtable, the topic was "Deoxidation of Steel—Theory and Practice," with F. F. Franklin, metallurgical engineer, Vanadium Corp. of America, New York, as the speaker. Clyde Wyman, metallurgist, Burnside Steel Foundry Co., Chicago, served as chairman.—*Erle F. Ross.*

Central Indiana

NORMAN J. DUNBECK, vice president, Eastern Clay Products Co., Jackson, O., spoke before the Apr. 7 meeting of the Central Indiana Chapter of the AFA on "Chemically Coated Sands." Jack Giddens, International Harvester Co., Indianapolis, served as technical chairman.

Chemical coating of sand for actual foundry use is comparatively recent in application, having been used in a production foundry since the first of this year. Mr. Dunbeck explained that the coating is actually a plastic which is added in a sand mixer and then passed through sand driers. The coating must be able to burn at low temperature, have a high fusion point, be non-thermosetting and be reusable.

Mr. Dunbeck pointed out that sands coated with plastic have a higher permeability due to less clay, no seacoal and less fines, and thus need less water and require less mulling time. Strength of the sand appears to be a result of both chemical and physical reactions. Molders like the sand because it is cleaner, flows more easily, and does not have a high deformation.

Results of study of the plastic coated sands show it to be cleaner, less apt to dry, to have faster molding time due to fewer jolts, and to result in less scrap.

The speaker stated that Battelle Memorial Institute is studying exact control methods for the sand. While the cost is high, this is more than offset by savings resulting from use of this type coating.—*Jack Giddens.*

Canton

FINAL meeting of its third year was held Apr. 17 by Canton District Chapter of the AFA, with I. M. Emery, chairman, presiding. Approximately 95 members and guests were present. E. C. Troy, Dodge Steel Co. Philadelphia, in a discussion of "Foundry Practices," paid particular attention to heads, blind risers (Williams method) venting and molding practice. Mr. Troy was well informed on his subject as he is doing foundry research in this field.

Announcement was made of the new officers elected to serve during the year 1947-48. These include: Chairman, Charles F. Bunting, Pitcairn Co., Barberton, O.; vice chairman, Edward H. Taylor, F. E. Myers & Bro. Co., Ashland, O.; secretary, John L. Dickerson, Pitcairn Co., Barberton; treasurer, Otis D. Clay, Tuscora Foundry Sand Co., Canal Fulton, O.

Directors for the three areas of the chapter are as follows: Central (Canton): Nils E. Moore, Wadsworth Testing Laboratory; George C. Biggert, United Engineering & Foundry Co.; M. G. Winters, Winters Foundry & Machine Co. Eastern—Harry G. Stevener, American Steel Foundries, Alliance; Clair E. Shaw, American Steel Foundries, Alliance; Fred C. Blass, the Deming Co., Salem. Western—James W. Fairburn, Ashland Malleable Iron Co., Ashland; Thomas W. Harvey, Pitcairn Co., Barberton; Charles Scoville, Babcock & Wilcox Co., Barberton.—*Nils E. Moore, reporter.*

Northern California

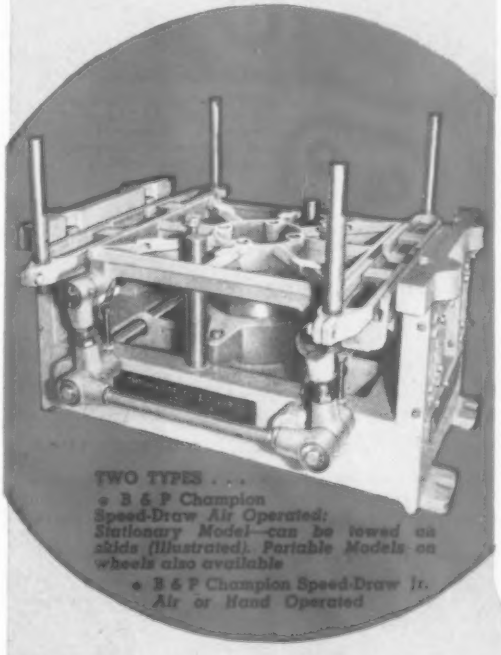
REGULAR monthly meeting of the Northern California Chapter of the AFA was held March 14 at Hotel Alameda, Alameda, Calif. Edwin K. Smith, consulting metallurgist of Beverly Hills, Calif., spoke on "Eighteen Kinds of Gray Iron from One Ladle."

Accompanied by slides, his commentary was interspersed with accounts of his experience as a government foundry technician in China, and it proved to the satisfaction of all that gray iron, properly prepared, is a good product and one that fills many widespread requirements.

Guests present at the meeting included Manuel Ferreria, Martin Hudak, Gordon Palmquist and Dale Rasmussen, all of Knute Palmquist Foundry; Mr. Freeman, American Wheelabrator Co.; John Maderas, Westinghouse Electric Corp.; Bill

NOW IT'S THE
B&P CHAMPION
SPEED-DRAW

Champion Power Flask Lift Machines have joined Beardsley & Piper . . . manufacturers of the famous Sandslingers! Now, both of these remarkable machines are available from one source . . . the B & P Champion Speed-Draw to quickly draw the molds from the pattern . . . the Sandslingers to ram fast and uniformly. Here is a combination that assures the utmost in mold production!



TWO TYPES . . .
• B & P Champion Speed-Draw Air Operated; Stationary Model—can be towed on skids (illustrated). Portable Models on wheels also available
• B & P Champion Speed-Draw Jr. Air or Hand Operated

ALL THESE ADVANTAGES

• 11 models, both Stationary and Portable, to cover maximum range of mold sizes.
• Each model quickly adjustable for maximum variation of mold size.
• Pattern mounting is simplified and low in cost.
• Pattern changes can be made quickly and easily with a minimum interruption of production.
• Positive pattern height maintained . . . results in perfect joint and uniform castings.
• Levelling of machine not required . . . accurate draw assured.
• Power applied to center of load . . . not through crank mechanism.
• Minimum overall height for maximum draw obtained.
• No time consumed in rolling over.
• Accurate lift with unbalanced load.
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• Long life accuracy through adjustable one piece gibs.

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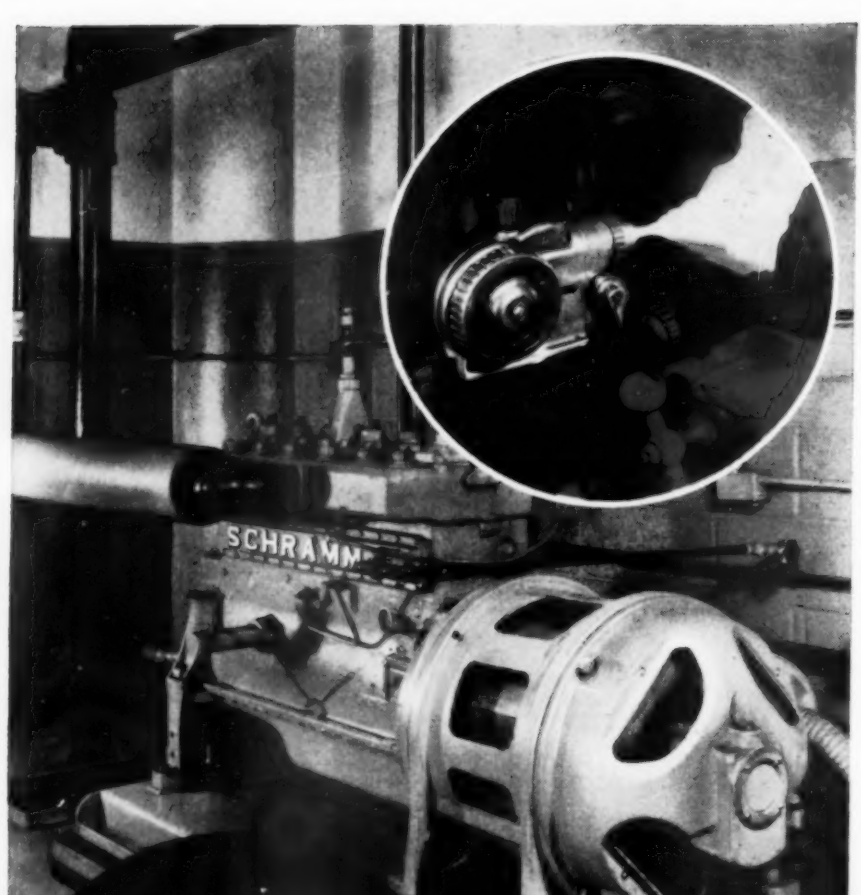


SCHRAMM "built-in" motor driven compressor

Schramm #210 stationary compressor operating metallizing gun and other pneumatic tools in the plant of the Metallizing Engineering Company, Long Island City, New York.

Reclaiming defective castings . . . a process developed to enable foundries and machine shops to effect a positive repair of defective aluminum castings. May also be used for reclaiming bronze, grey iron, malleable iron, as well as steel castings.

This is only one of the hundreds of different applications of compressed air for industrial and manufacturing plants as furnished by the Schramm heavy-duty, continuous service, built-in motor or "V" belt drive compressors ranging from 2½ to 600 cu. ft. displacement.

Write for catalog 45A.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Allen, Lynch Brass & Aluminum Foundry and Don Gleason, Hall-Scott Motor Car Co.—*Charles R. Marshall, publicity chairman.*

Northeastern Ohio

NORTHEASTERN Ohio Chapter of the AFA honored 95 old timers in the foundry business and 12 past chapter presidents at a party in the Cleveland Club, Cleveland, May 8. Attendance at the party broke all records for the season with 320 members and guests present. Henry Trenkamp, retiring chapter president, announced that attendance throughout the year had averaged 190 at each meeting. This is believed to be a record in the national association.

Bruce Simpson, president, National Engineering Co., Chicago, and a national director of the AFA, was present for the occasion.

Foundrymen with 40 or more years of service were guests of the chapter. Some of those with 60 or more years service include: Jules Matthews, 72 years, SPO Inc.; Ben Fuller, 66 years, retired; J. A. Horning, 65 years, Ohio Foundry Co.; Gus Zimmerman, 65 years, Eberhard Mfg. Co., and Henry M. Oehling, 61 years, National Malleable & Steel Castings Co.

Plaques were presented to each of the 12 past presidents of the chapter in honor of their service.

Officer and director nominees presented at the April meeting were unanimously elected for next year. — *Robert H. Herrmann.*

• • •

An overflow attendance of 230 gathered for the Apr. 10 meeting of the Northeastern Ohio Chapter of the AFA at the Cleveland Club, Cleveland, to hear an interesting and informative discussion of "Core Blowing" by John Mescher, superintendent of core department, Unicast Corp., Plant 3, Toledo, O. Chapter President Henry J. Trenkamp, the Ohio Foundry Co., Cleveland, presided.

Annual nomination of officers and directors for the ensuing chapter year was presented, subject to election at the May 8 meeting. Nominees are: President, H. C. Gollmar, general manager, Elyria Foundry Division of Industrial Brownhoist Corp., Elyria, O.; vice president, E. C. Zirzow, coreroom foreman, National Malleable & Steel Castings Co., Cleveland; secretary, R. D. Walter, metallurgist, Werner G. Smith Co., Cleveland; treasurer, F. Ray Fleig, president, Smith Facing & Supply Co., Cleveland.

Directors named to serve for three years are Prof. G. M. Cover, Case School of Applied Science; E. C. Fahlman, the Permold Co., Medina, O.; Gilbert J.

(*Continued on page* 182)

GRINDERS... ALL KINDS!

FOR VITRIFIED AND HIGH SPEED WHEELS.

SINGLE OR MULTIPLE SPEED.

MOTOR DRIVEN — BALL BEARING

Belted Motor Driven Grinders are Modern Tools. There is a greater clearance for the work in relation to the front of the machine and the face of the wheel.

Then, too, the ratio on the V-belt Drive permits providing the correct peripheral speed on either Vitrified or Resinoid Bond Wheels.

The Multiple Speed Machine allows for obtaining maximum wheel wear, lower wheel cost, higher production, all by maintaining the peripheral speed throughout wheel life.

The No. 30 Grinder illustrated at the upper right made in sizes of 5 H.P. for 18" wheels up to 15 H.P. for 30" wheels. Larger motors to order. The distance between wheels is 55" or 59".

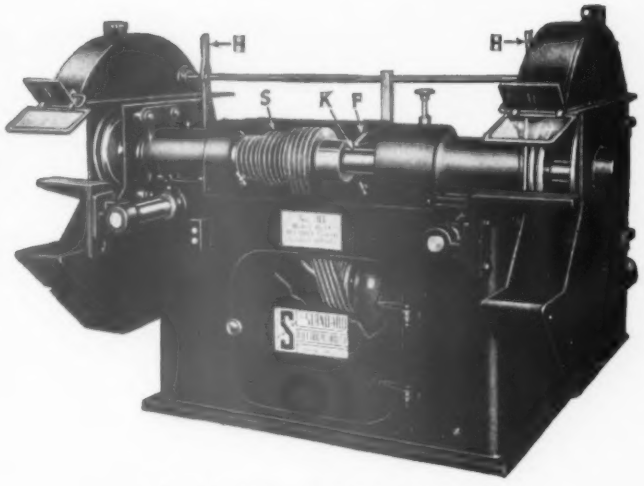
Type CD at lower right is a Pedestal Model Combination Grinder-Disc Grinder with Lever Feed Table. (Also available as a Double End (type DD) Disc Grinder. Sizes: 5 H.P. 18"; 5 H.P. 20" and 7½ H.P. 20" wheels.

EQUIPMENT on these two Grinders:

*Boiler Plate Steel Guards, adjustable to wheel wear.
*Multiple V-belt Drive.
*Ball Bearing Motors.
*Speed Control on Multiple Speed Grinders.

Optional:

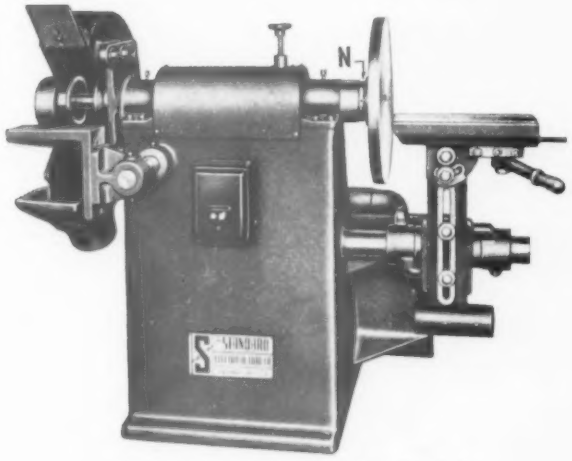
Single Speed or Multiple Speed.
Flanges for large bore wheels.



NO. 30 (30" 15 H.P. Illustrated)

TYPE LG

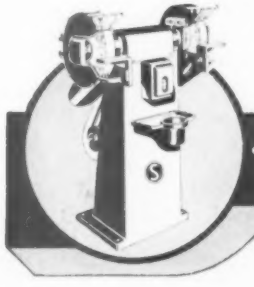
The Type LG is a light weight Portable Grinder with 3 phase motor. The 12LG has a 1 H.P. motor for 6"x1" grinding wheel and weighs 28 pounds. The 18LG 1½ H.P. 7"x1½" wheel grinder weighs 33 pounds. **Delivery on 12LG from stock.**



TYPE 5CD (5 H.P. 18" Illustrated)

Write for our Complete Catalog which describes "GRINDERS—all kinds!", from ½ H.P. to 30 H.P. Also a complete line of Disc Grinders. Long Distance phone Wabash 1677.

VISIT OUR BOOTH No. 83 AT THE INDUSTRIAL FINISHING EXPOSITION IN DETROIT JUNE 23 TO 27.



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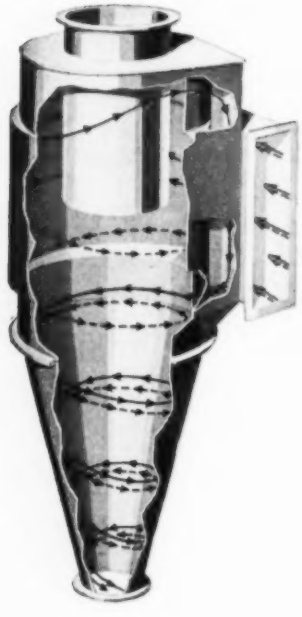
IN DUST RECOVERY . . .

Performance "paved with good intentions" isn't enough!

Buell is the champion of Fractional Efficiency Performance Guarantees as the only way to assure the user's after satisfaction.

Dust, inevitably, is a mixture of coarse particles, fine, still finer, and so on down to low-micron sizes. Almost as inevitably, there will be a critically important fraction of certain fines. You HAVE to know that they will be effectively trapped in your dust control apparatus.

Buell tells you in detail! And nothing less than complete Fractional Efficiency Curves present a true picture.



Buell performance is in a class apart because of its design. The patented van Tongeren harnessing of the otherwise mischievous "double eddy" current is at the heart of the matter. The Shave-off is the pay-off!

What it is and why it makes so vital a difference is the subject of an interesting exposition in "The van Tongeren System of Industrial Dust Recovery". Free for the asking. Write: Buell Engineering Company, 14 Cedar Street, New York 5, N. Y.

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Engineered Efficiency in DUST RECOVERY

(*Continued from page* 180)

Nock, vice president, the Nock Fire Brick Co., Cleveland; John Schneider, industrial sales department, Cleveland Electric Illuminating Co., Cleveland; John Urban, foundry superintendent, the Fanner Mfg. Co., Cleveland.

At the technical session Mr. Mescher described the general practice of blowing cores, illustrating his remarks by slides and by a display of typical blown cores, coreboxes, blow plates and vents. He emphasized the importance of proper size and location of blow and vent holes. Ratio of size of vent holes to blow holes should be 2 to 1 in the case of slotted vents and 4 to 1 for the screen type.

At the conclusion of his talk Mr. Mescher was aided in answering the numerous questions which developed, by Russell F. Lincoln, Russell F. Lincoln & Co., and Leon F. Miller, the Osborn Mfg. Co., who served as discussion leaders.—*W. G. Gude, publicity chairman.*

Western New York

REGULAR monthly meeting of the Western New York Chapter of the AFA was held Apr. 4, at Hotel Touraine, Buffalo, with approximately 56 members and guests in attendance. Elliot R. Jones, vice chairman, presided. Reinhold D. Loesch, Lake Erie Foundry Co., Buffalo, introduced the guest speaker, C. E. Westover, Westover Engineers, Milwaukee, whose talk was entitled "Labor vs Higher Skills."

Mr. Westover explained that one of the problems of management today is to interest unskilled workers to aspire to jobs requiring higher skills.

He pointed out that if unskilled production workers on an incentive wage basis are able to earn more than highly skilled workers, a condition which requires correction or general dissatisfaction is bound to result. By the use of lantern slides he showed examples of variations in earnings between skilled and unskilled workers.

To arrive at proper job evaluation, a careful study of working conditions, point value of each job and skill required must be made.—*Leslie C. Thellemann.*

Quad City

OVER 100 members and guests of the Quad City Chapter of the AFA heard R. L. McIllvaine, vice president and sales manager, National Engineering Co., Chicago, discuss "Foundry Mechanization," March 17 at Fort Armstrong Hotel, Rock Island, Ill. Mr. McIllvaine's talk was illustrated with lantern slides showing mechanized unit types and layouts.

Coffee hour entertainment consisted of

(*Concluded on page* 184)

3 PROVED Ways To BOOST FOUNDRY PROFITS

WITH A

DESPATCH

VERTICAL CONVEYOR CORE-BAKING OVEN

IF you're looking for *proved* ways to keep core costs down and increase profits, too, then here's an answer—a DESPATCH Vertical Oven, expertly engineered to fit your foundry's special needs.

Need for faster output of better castings, increased competition, skyrocketing labor and over-head and limited floorspace are problems this oven can help you solve profitably *right now.*

Maximum
BAKING OUTPUT PER MANHOUR

No other type of oven uses labor so efficiently nor provides such direct straight-line handling. Fastest route from coremakers to oven with each man's work area covering only a few feet. Handy-level loading, built-in cooling section and other work-saving features.

Maximum
CORE OUTPUT PER FT. OF FLOOR SPACE

Compact vertical construction, forced convection heating and ingenious arrangement of core racks on conveyor makes *best* use of limited floorspace. Sizes capable of baking up to 10,000 lbs. per hour yet using only 10′ x 10′ floor area.

Maximum
CORE OUTPUT PER GALLON* OF FUEL

*Or other fuel-unit.

A Despatch vertical conveyor oven recirculates up to 75% of heated air. With engineered oven design that keeps heat loss at minimum, peak efficiency is assured under all operating conditions. Results in extra low cost per ton of baked cores. (Figures on request).

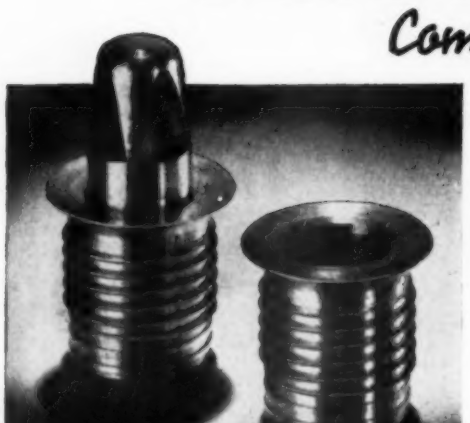
WRITE TODAY for data on savings possible with Despatch mechanized ovens. Actual figures, floor plans and other data you'll find tremendously helpful.

DESPATCH OVEN CO.
201 Despatch Building
8th St. at 7th Ave., S. E.
Minneapolis 14, Minn.

DESPATCH OVEN COMPANY

OVER 44 YEARS EXPERIENCE AS ENGINEERS AND BUILDERS OF ALL TYPES OF FOUNDRY OVENS

The
WELLMAN
PRODUCTS
Company E. 49th at SUPERIOR CLEVELAND 3, OHIO



SQUARE HEAD BRASS AND STEEL DOWELS

"The Old Favorite"

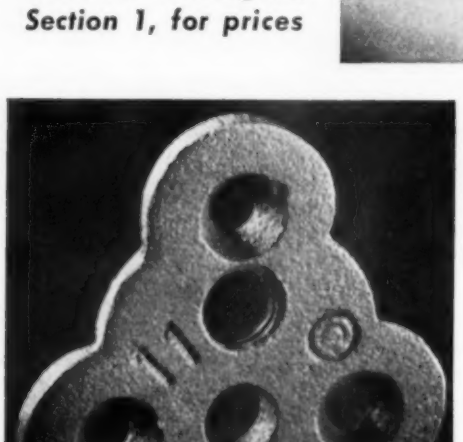
All sizes manufactured in our own screw machine department

Malleable DOWELS

Sizes: 1/4, 3/8, 1/2, 5/8, 3/4

Order now for summer delivery

Write for Catalog 40, Section 1, for prices



Malleable RAPPING PLATES

Several popular sizes now in stock!

Write for prices

TYPICAL SIZES:

No.		No.	
1 —	5/8" x 1 1/2"	11 —	2 1/4" x 2 1/4"
5 —	3/4" x 1 5/8"	12 —	1 1/4" x 3 3/4"
6 —	3/4" x 2 1/4"	14 —	1 1/4" x 4 1/2"
8 —	7/8" x 3 1/4"	16 —	2 3/4" x 2 3/4"
9 —	1" x 3"	17 —	3" x 5 1/2"

(*Concluded from page* 182)

movies showing highlights of some of the major college football games of the 1946 season.

At the meeting held April 21 at Fort Armstrong Hotel, R. G. McElwee, manager, Gray Iron Division, Vanadium Corp. of America, Detroit, discussed "Cupola Operation with Present Day Material Shortage." Mr. McElwee stressed the fact that all gray iron foundries are faced with a shortage of raw materials and that they should strive for higher yields.

Annual election of chapter officers for 1947-48 was held also. Election results are: R. H. Swartz, Riverside Foundry, S & W Corp., Bettendorf, Iowa, chairman; M. H. Liedtke, International Harvester Co., Farmall Works, Rock Island, Ill., vice chairman; C. R. Marthens, Marthens Co., Moline, Ill., secretary-treasurer. New directors for three-year periods are: W. C. Bell, Frank Foundries Corp., Moline, Ill.; H. L. Mead, John Deere Harvester Works, East Moline, Ill. and H. A. Rasmussen, Ferro-Bronze Corp., Moline. —*C. R. Marthens, secretary-treasurer*

POURS ENGINE CASTINGS IN DRY SAND MOLDS

(*Continued from page* 91)

Cleveland plant. The hoist, controlled from the floor, is suspended from a swinging I-beam attached to a building column in the vicinity of each of the four casting pits. These cranes are particularly appreciated during the afternoon when the overhead electric traveling cranes are busily engaged distributing metal from the cupola.

The pattern for the engine base is constructed on plain and simple lines, designed to produce a cavity in the sand in which a set of dry sand cores are assembled to form the inside and outside of the casting. Patternmaking expense is reduced to a minimum, and the cost of molding is reduced to a corresponding extent since no facing sand is required, and it is only necessary to ram the required amount of black sand between the pattern and the walls of the pit—a performance that involves little particular training or technical skill.

Training and experience are essential on the part of the men who set the cores in place, properly spaced and anchored to prevent movement in any direction when the mold is filled with metal. Vent passages in the cores must be connected to suitable exits in the mold walls for the escape of gas. Study of the pattern will show the construction of the outside

(*Continued on page* 188)

Only AJAX

LO-VEYORS

GIVE YOU ALL THESE COST-CUTTING FEATURES

The exclusive Ajax design principles are responsible for the low maintenance cost and, in turn, low material handling costs.

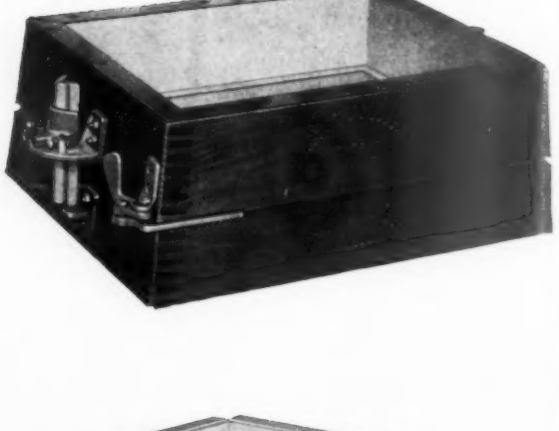
1. 3 basic parts—the pan or tube . . . the vibrating or shaking mechanism . . . the motor, variable speed drive or other source of power to drive the shaker.
2. Completely self-contained, ready to use.
3. Completely enclosed drive unit with only 2 working parts.
4. Conveyor pan supported by flat springs mounted in rubber bushings,—no exposed bearings, no eccentric shafts, idler and tail pulleys.
5. Pan or tube can be made of ferrous or non-ferrous metal and can be lined or coated for protection against contamination.
6. Pans available with or without covers.
7. Tubular conveyors provide gas-tight construction for critical process and explosive operations.

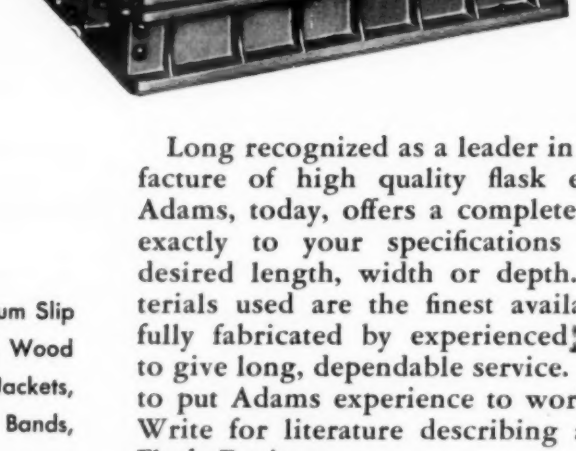
Write giving outline and sketch of your requirements for handling dry aggregates.

AJAX FLEXIBLE COUPLING CO. INC.

CONVEYOR AND SCREEN DIVISION • WESTFIELD, N. Y.

. . . a profitable combination for any foundry





Adams Flask Equipment

Cherry Snap Flasks, Cherry Slip Flasks, Aluminum Slip Flasks, Easy-Off Flasks, Cherry Presser Boards, Wood Bottom Boards, Steel Bottom Plates, Steel Jackets, Aluminum Jackets, Cast Iron Jackets, Steel Bands, Steel Upsets, Cherry Upsets, Aluminum Upsets

Long recognized as a leader in the manufacture of high quality flask equipment, Adams, today, offers a complete line built exactly to your specifications with any desired length, width or depth. All materials used are the finest available, carefully fabricated by experienced craftsmen to give long, dependable service. Plan now to put Adams experience to work for you. Write for literature describing all Adams Flask Equipment.

THE ADAMS

DUBUQUE,

MOLDING MACHINES . . . . . FLASK

The 12"-38" Adams Portable Jolt Squeezer, Side Rod Type

Adams Molding Machines

Adams Molding Machines are the answer to the foundry's need for production equipment that makes possible greater volume at lower unit cost. They are offered in a variety of sizes—post and side rod models; air operated or hand operated; stationary and portable for jolt-squeeze and jolt-squeeze-pattern-draw.

Design is simple and construction rugged, incorporating such features as valveless jolt mechanism . . . adjustable knee valves . . . rust proofed stop rods, side rods and adjusting nuts . . . interchangeable parts . . . easily adjusted pressure regulator . . . automatic lubrication . . . complete protection against entry of sand and dust. Operation is quickly mastered by inexperienced help.

Catalog No. 705 gives complete mechanical details and specifications for all Adams Molding Machines. Write for a copy, today. THE ADAMS COMPANY, 900 Foster St., Dubuque, Iowa.

COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

To STOP "burning in"... NOTE THIS TRIAL OFFER

Introducing you to the merits of

MOLDUKO

(TRADE MARK REGISTERED)

A PATENTED CORE AND MOLD PROCESS FOR ALL METALS

A LONG LIST OF FOUNDRIES HAVE BEEN USING IT FOR YEARS

We are now in a position to supply Molduko to new users and would like, therefore, to have YOU try it on the work you are doing now. Primarily intended for use on dry sand cores and molds to produce *extremely smooth surfaces,* Molduko also has an application to certain green sand molds and chills. Available in types for steel, gray iron, brass and bronze work, it effects pronounced savings in cleaning and inspection costs. As one of our foundryman-customers puts it, ". . we find Molduko far superior . . . . "

WRITE FOR DESCRIPTIVE BULLETIN "F"

TRIAL OFFER: If you will advise the type of work you are doing, troubles you are having and approximate weekly production, we'll be glad to send you a working sample consisting of a 10 gallon combination of liquid and special filler, to be billed at the full-drum price.

MOLDUKO Processed Core Used *Untreated Core Used*

Both of these Castings Poured from same crucible.

SUPERFLAKE GRAPHITE PRODUCTS

SUPERIOR FLAKE GRAPHITE COMPANY

Manufacturers of mold and core washes, facings, parting compounds, core paste, carbon-raiser.

TELEPHONE: RANDOLPH 7939

33 So. Clark Street *Chicago (3) Ill.*

(*Continued from page* 184)

where the smooth boards are attached vertically to the substantial inside frame. Light steel straps with a toe at the lower end and a hole at the top for attaching the lifting hooks, facilitate handling the pattern into and out of the pit and into and out of storage.

A type of crane shown in Fig. 2 is of the same genus or family employed by wrecking crews and auto garages for towing helpless cars to the junk yard, or to the repair shop. City traffic police, using a model slightly different in detail but similar in general principle, pick up cars, ignorantly, carelessly or brazenly left in forbidden areas. The veteran crane shown in the illustration has been in constant operation for the past 18 years, or approximately since the foundry was built. It has paid for itself over and over or, to quote from the ordinary shop vocabulary, "It don't owe nobody nothin'." The crane has a lifting capacity of 3000 lb on a 9-ft radius, and is employed the greater part of the time either in lifting, fitting and assembling cores on the wall side of the gangway, or in placing cores in molds anywhere in the main bay within reach of the boom.

Cores Handled by Floor Crane

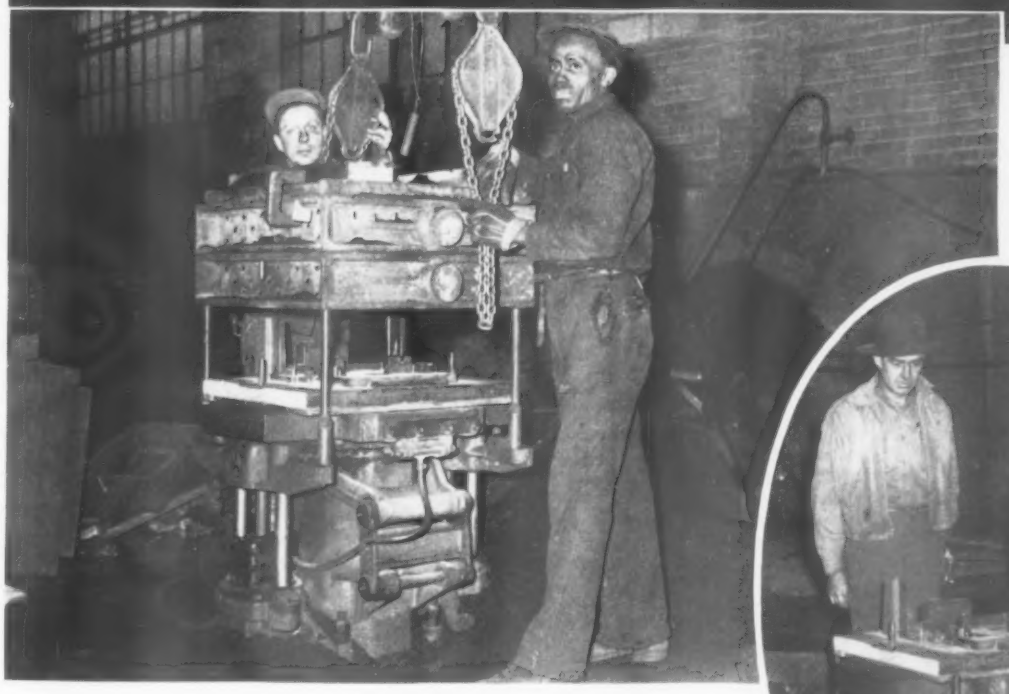
The illustration shows it lowering cores into the mold for a 1000-hp diesel engine frame casting. The pattern for this casting is mounted on a master plate and the sand is rammmed by hand. To facilitate the drying of this and other large molds made in flasks, a cast iron grating is used on the drag instead of the usual type bottom plate. The cleaned casting weighs 6475 lb and the mold is filled with metal in 55.2 seconds.

Fig. 3 shows the mold, pattern and core for a 1000-hp diesel engine liner. The mold is made, dried and cored in a horizontal position and then turned up on end where it is filled with metal. In many plants the invariable rule is to pour liners and other castings of a somewhat similar character, through a ring of pop gates on the top. In the CPT Co. foundry, consistently clean castings are produced by pouring metal through a long, upright sprue terminating in a dirt catching chamber at the bottom. From this chamber the metal enters the mold through a whirl gate. Casting weight is 925 lb.

In contrast to the foregoing is the diesel engine piston core shown in Fig. 4. This core rests in a print at the top, and thus seals the top of the mold. Metal enters the mold through a ring of small pop gates. The two half cores are rubbed to a bearing and calipered, then parted temporarily while a light ribbon of paste is applied to the face. The

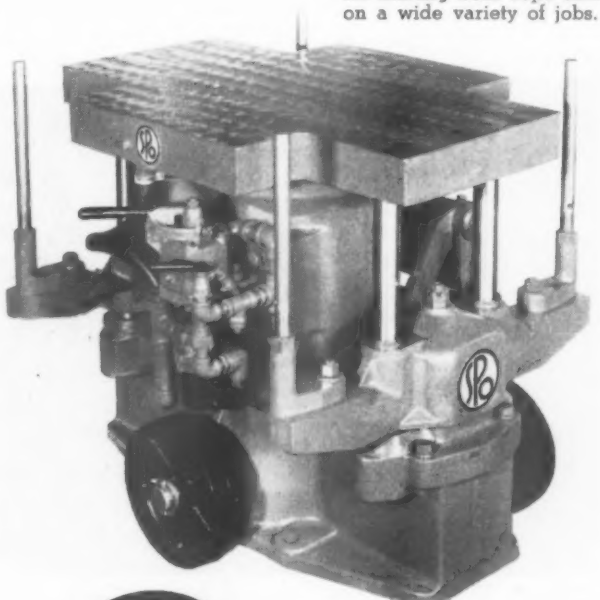
(*Continued on page* 190)

SPO Jolt Stripper Molding Machines



Local foundry uses SPO Jolt Strippers for making both cope and drag molds on a wide variety of jobs.

Fast! Profitable! Flexible!



A typical SPO No. 300 Series Jolt Stripper—a fast, flexible, money-making asset.

SPO No. 300 Series Jolt Strippers are favorites in many foundries because they are:

1. *SIMPLE.* Very few working parts and those essential.
2. *ACCURATE.* Pattern draw accurate throughout, though unusually long, insuring molds true to pattern.
3. *CONVENIENT.* All operations are controlled from one valve station.
4. *VERSATILE.* Handle wide range of flask sizes and shapes.
5. *FAST.* Proven profit-makers on both long and short runs.

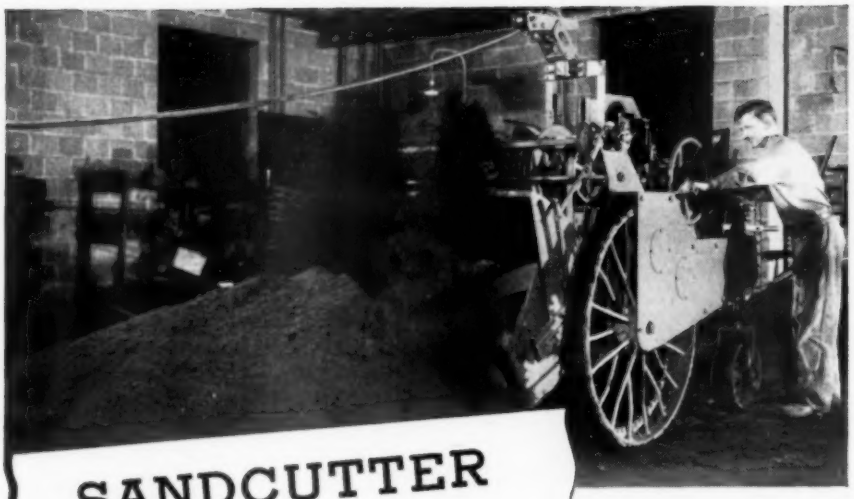
Ask for bulletin giving capacities and specifications of the SPO No. 300 Series.

MEMBER

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

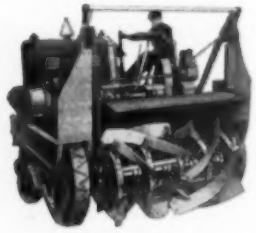
7500 GRAND DIVISION AVENUE • • CLEVELAND 5, OHIO



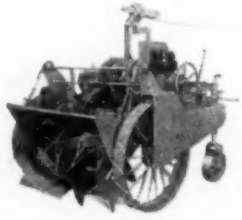
SANDCUTTER
cuts labor turnover

"Our labor turnover before installing the Sandcutter was 57 men in one year's time. Since July, 1946, when we received the Sandcutter, we haven't lost a man." (Quoted from a letter received from Mr. Stanley J. Sitarz of the Prospect Foundry Co., Minneapolis)

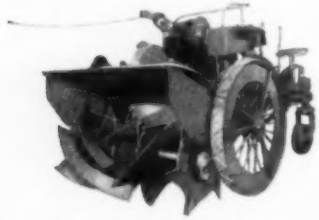
Besides keeping workmen on the job, by eliminating the drudgery of hand-shoveling, the Sandcutter also cuts costs and does a more thorough job of conditioning sand. Molders prefer the texture of sand cut this way because it enables them to turn out better molds, and rejects are far less frequent. *You* profit all along the line.



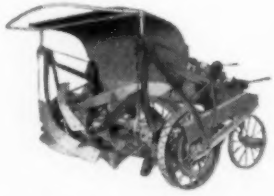
The model "K" is the largest Sandcutter. It embodies the maximum in capacity and rugged endurance for heavy continuous production.



The Model "AM" Sandcutter is the smallest Sandcutter. We recommend it for use on light to medium floors. Write for Bulletin 25-A.



The Model "M" Sandcutter is a heavily constructed, multi-motor operated machine which we recommend for medium to heavy floors. Write for Bulletin 20.



The Model "AA" Sandcutter is a rugged, medium-duty Sandcutter which we recommend for use on medium to heavy floors. Write for Bulletin No. 15.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka, Indiana

Sandcutters

(*Continued from page* 188)

halves then are attached to each other solidly by pouring molten lead into a ⅛-in. hole extending through the center of the wristpin core. Advantages of this method over the usual two or three strands of wire are obvious. The hole in the wristpin is formed by a small post in the corebox. The mold is rammed on a jolt machine, with three patterns in a flask. Casting weight is 108 lb. Burning in or metal penetration of the feather edge section of the core is prevented by adding 2 per cent iron oxide to the oil sand core mixture, and by painting this part of the core with a proprietary mold wash originally developed for use in the steel foundry.

Two cupolas, one lined to 48 in. and the other to 63 in. diameter, are available for melting the iron. For the last several years the larger cupola has been used continuously, melting the daily heat of 20 to 35 tons. Management favors the practice of melting and pouring the iron at maximum temperature. To that end and to the securing of well defined chemical and physical properties in the castings, every feature connected with the cupola operation is under close control.

Amount of Air Is Controlled

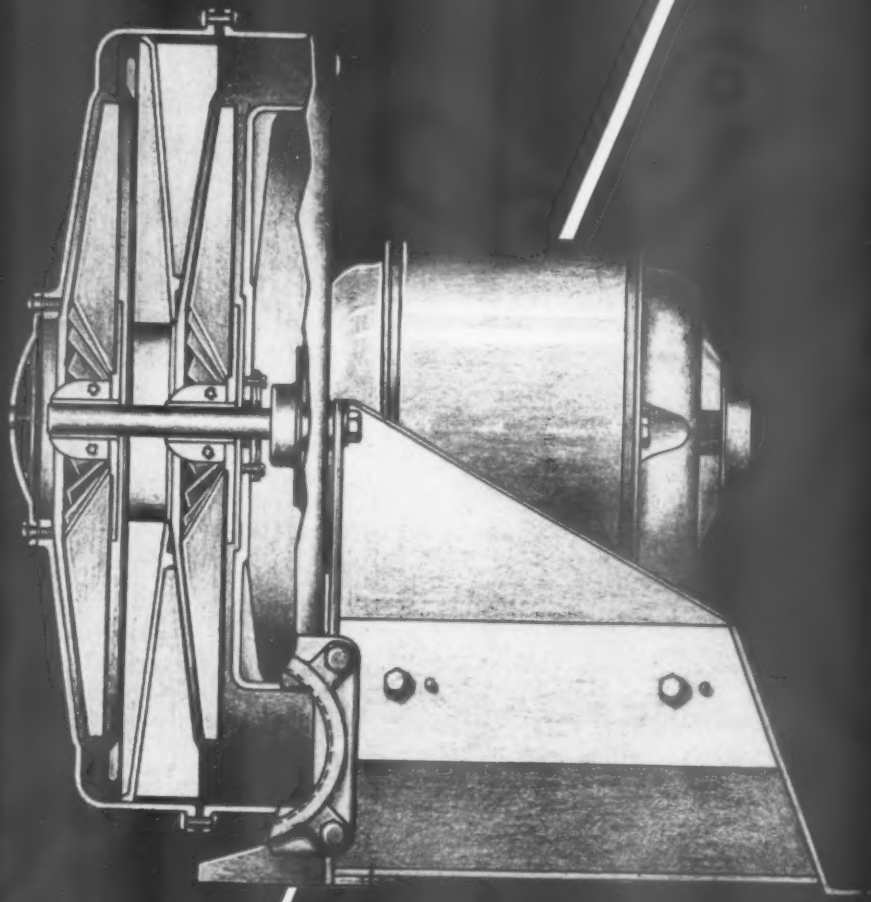
Coke consumption is in the ratio of 1 part coke to 7½ parts iron or 400 lb coke to each 3000 lb iron charge. An air weight control device regulates the flow of air to 4500 cfm. The amount of steel scrap incorporated in every charge varies from 10 to 40 per cent. Steel rails are favored over other types of steel scrap. At one time scrap rails could be secured, cut to any specified length. At present and for the past several years, rail scrap, when available, is delivered in miscellaneous lengths and cut to the desired lengths by the men who make up the charges. The flange is nicked on each side with an acetylene torch and then a smart blow from a sledge hammer breaks the rail. Charges are made up and weighed on buggies in the roofed stock yard, taken up to the charging platform on an elevator, and charged into the cupola by hand.

A small container attached to the front of the cupola shell facilitates the addition of alloys to the cupola stream as it flows from the tap hole to the ladle. Diesel engine cylinder heads, liners, pistons, valve cages and frames are made from high-test iron containing nickel, chromium, molybdenum. Ferrosilicon also is added to the iron, especially for castings of light section. Tensile strength varies from 30,000 to 55,000 psi. Typical analysis of the 40 per cent steel mixture shows: Combined carbon 0.65 per cent.

(*Concluded on page* 192)

Trouble-Free

DESIGN....



Turbo Blowers

by North American

Manufacturing Company

GAS OR OIL COMBUSTION EQUIPMENT

CLEVELAND 5, OHIO

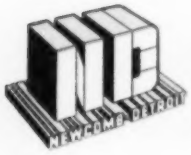
DISCHARGE SHAKE-OUT AIR... CLEANSE, RECIRCULATE OTHER FOUNDRY AIR...

within one unit!

THE **UNI-WASH SHAKE-OUT BOOTH** *with* **AUTOMATIC DAMPER**

Under normal conditions when the shake-out is not operating, the Uni-Wash Shake-Out Booth collects and cleanses dirty foundry air, then recirculates it . . . clean and healthful. However, when any shake-out is operating, recirculating of air is not practical due to increased concentration of dust particles in the air. Realizing this condition, Newcomb-Detroit developed the Automatic Damper . . . to direct the washed shake-out air out-of-doors during the shake-out operation; to recirculate cleansed foundry air when the shake-out is shut off. In effect, the Uni-Wash Shake-Out Booth with the Automatic Damper operates as a space air washer when the shake-out is not in operation, collecting the foundry air—washing it—then recirculating it in the work area.

In addition to the Automatic Damper, the Uni-Wash Shake-Out Booth contains many other advanced features such as automatic sludge removal, lower initial cost and delivery pre-assembled. Fully illustrated catalog gives complete details. Send for it.



Established 1912

NEWCOMB-DETROIT COMPANY

5741 Russell Street • Detroit 11, Michigan

(*Concluded from page* 190)

graphitic carbon, 2.63 per cent, manganese 0.70 per cent, silicon 1.58 per cent, sulphur 0.077 per cent, phosphorus 0.18 per cent, chromium 0.20 per cent, nickel 0.25 to 1.00 per cent, molybdenum from 0.25 to 0.50 per cent.

Analysis for the 10 per cent steel mixture shows: Combined carbon 0.60 per cent, graphitic carbon 2.86 per cent, silicon 2.00 per cent, sulphur 0.09 per cent, phosphorus 0.22 per cent, manganese 0.60 per cent.

Cores, Sands And Binders

(*Continued from page* 75)

under present day production conditions core sand is in so much demand by the coremakers that too little, rather than too much, time is usually taken in developing the green bond.

Core oil is added to a core sand mixture primarily for dry (or baked) bond, and secondarily for flowability. The very presence of an oily substance in the core sand mixture lubricates the sand grains, allowing greater movement under such a sudden impact as core blowing or ramming.

Why should the core oil be added to the formulation *after* the water? This question repeatedly appears in foundry discussion. The answer is that it may be added at any time during the mixing cycle with apparently the same foundry results. However with a core sand mixture containing a cereal binder, it is more difficult to develop the green bond if the cereal particles are first coated with a layer of core oil.

We all know that water will displace oil, since oil floats on water. Therefore, why displace the oil from a cereal binder and then work the water into the starch if we can bring up the green bond more quickly by adding the water first?

Even if no cereal binder is present in the core sand formulation, it is better to add the water first. The moisture will mix much more easily than oil with a dry sand. Once the moisture is in the mixture, the sand grains are held apart and are much more receptive to the oil addition.

It has been argued repeatedly that we wish to coat the individual sand grains with oil first to get maximum baked bond, but if we add water later we are bound to drive some of the oil away from the surface of the sand grains. The

(*Continued on page* 194)

ENTHUSIASM

.... TYPICAL OF THE MANY REPORTS FROM USERS OF CARL-MAYER OVENS

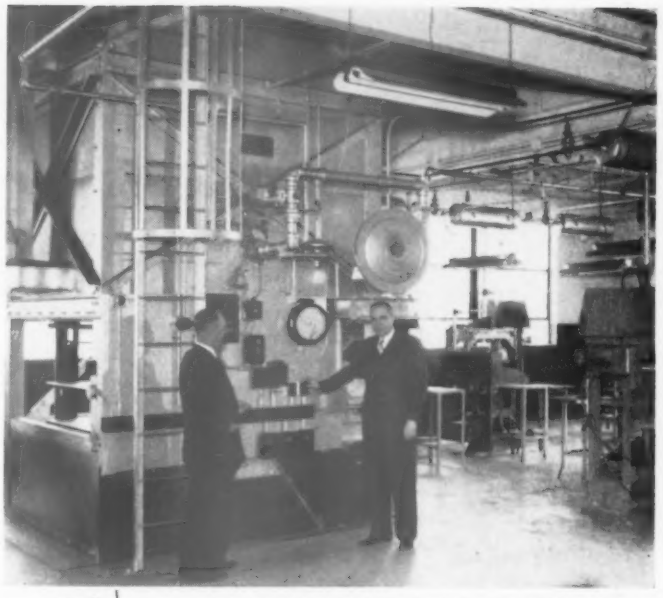
LIKE THIS

The Carl-Mayer Patented (Pat. No. 2,257,180) Recirculating Heating System assures fast, uniform core and mold baking.

Repeat orders from many well known foundries, in face of wide competition, prove the extent of Carl-Mayer Oven advantages.

Rugged construction is another important Carl-Mayer feature. You can depend on these ovens for long life and low maintenance.

Write for Bulletin.



CARL-MAYER VERTICAL CORE OVEN
At Union Brass & Metal Mfg. Co., St. Paul, Minn.

Union Brass & Metal Manufacturing Company
INCORPORATED 1922
PLUMBERS BRASS GOODS
Telephone Humboldt 1331 *501 West Lawson Avenue* *Saint Paul 3, Minnesota*

April 9, 1947

Mr. C. F. Mayer, President
The Carl Mayer Corp.
3030 Euclid Avenue
Cleveland 15, Ohio

Dear Mr. Mayer:

We are very much pleased to enclose two copies of a photograph showing your core oven and our core room layout. The gentlemen in the picture reading from left to right are our Sales Manager and Secretary, Mr. George F. Gerlach, and our President and General Manager, Mr. Henry J. Michel.

Since this picture was taken, we have added two core blowing machines. They are approximately directly under the receiving tanks which are shown in the picture.

As you probably know, our new core room was laid out on paper and a building constructed to house this new equipment. We are very proud of our new core room and would be more than glad to show it to you or to any one interested.

The oven is operating beautifully, and we are very much pleased with the results so far.

Yours very truly,

UNION BRASS & METAL MFG. CO.

C. J. Becker
Vice Pres. & Treasurer

CJB:jh

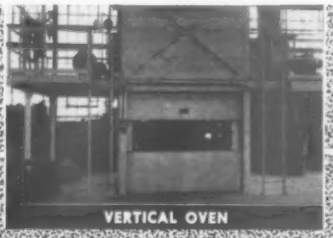
Encl. 2

A FEW CARL-MAYER CUSTOMERS:

Aluminum Co. of America
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
Union Brass & Metal Mfg. Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

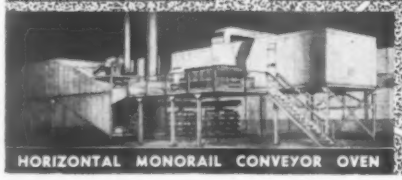
ROLLING DRAWER OVEN

PORTABLE RACK OVEN



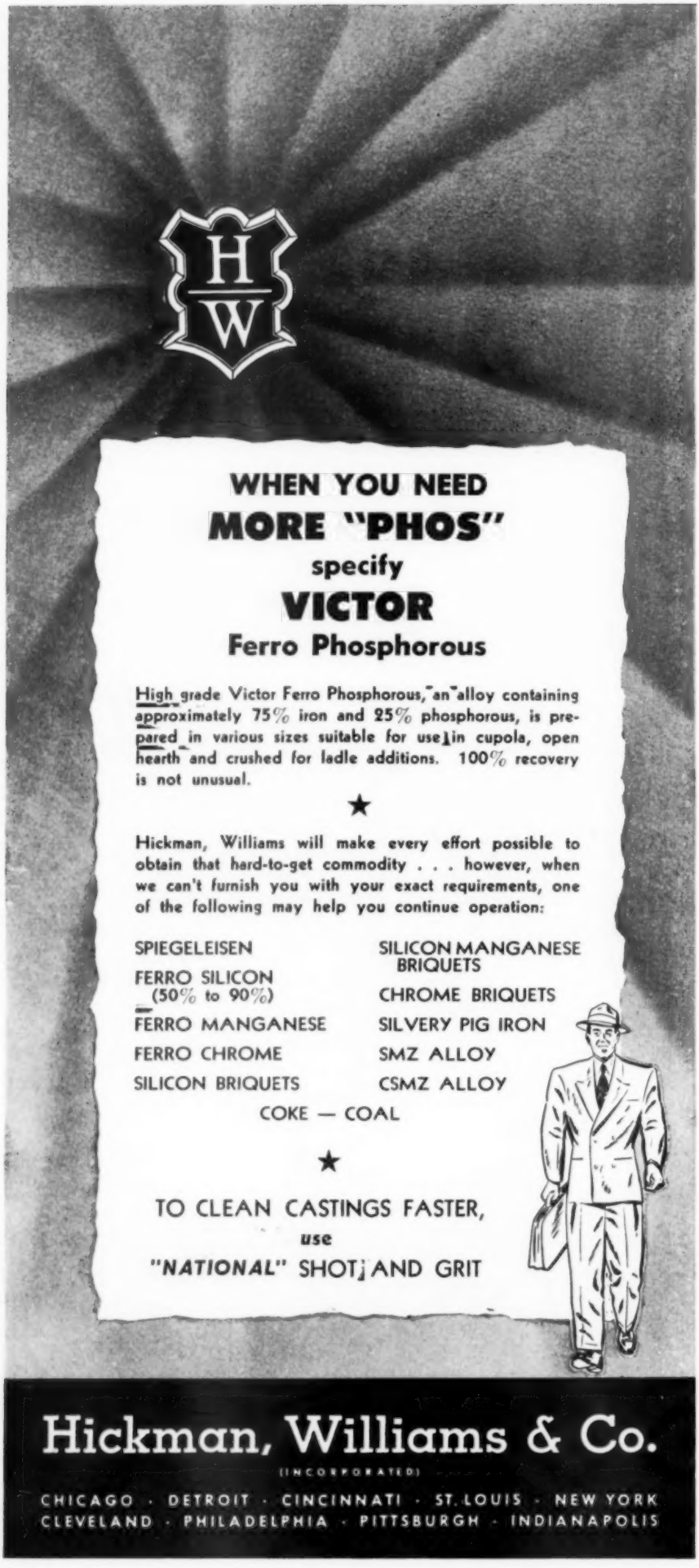
VERTICAL OVEN

CAR TYPE OVEN



HORIZONTAL MONORAIL CONVEYOR OVEN

The CARL-MAYER *Corp.*
3030 EUCLID AVE. CLEVELAND, OHIO
CORE AND MOLD OVENS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W
WHEN YOU NEED
MORE "PHOS"
specify
VICTOR
Ferro Phosphorous
High grade Victor Ferro Phosphorous, an alloy containing approximately 75% iron and 25% phosphorous, is prepared in various sizes suitable for use in cupola, open hearth and crushed for ladle additions. 100% recovery is not unusual.
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Hickman, Williams will make every effort possible to obtain that hard-to-get commodity . . . however, when we can't furnish you with your exact requirements, one of the following may help you continue operation:
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TO CLEAN CASTINGS FASTER,
use
"NATIONAL" SHOT AND GRIT
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(*Continued from page* 192)

present method of laboratory testing shows no appreciable difference in baked strength despite the place of core oil addition in the mixing cycle. Therefore, the reason for adding the moisture first is ease of mixing and resulting better green bond when cereal binder is used in the formulation.

How long should the core oil be mixed in the core sand? Since the core oil is added primarily for baked bond, it should be mixed long enough to give a homogeneous coating around the individual sand grains. The actual mixing time is a function of the grain size of the sand, the type of mixer used, and the viscosity of the core oil. The finer the grain size of the sand, the more surface to cover; hence the longer mixing time. The more viscous the oil, the more work must be done to spread it evenly; hence a more extended mixing cycle. The best method of evaluating the shortest possible mixing time is to make tensile briquets after different mixing times and bake these under production conditions. The minimum mixing time which gives the maximum baked bond is the nearest approach to the correct mixing time.

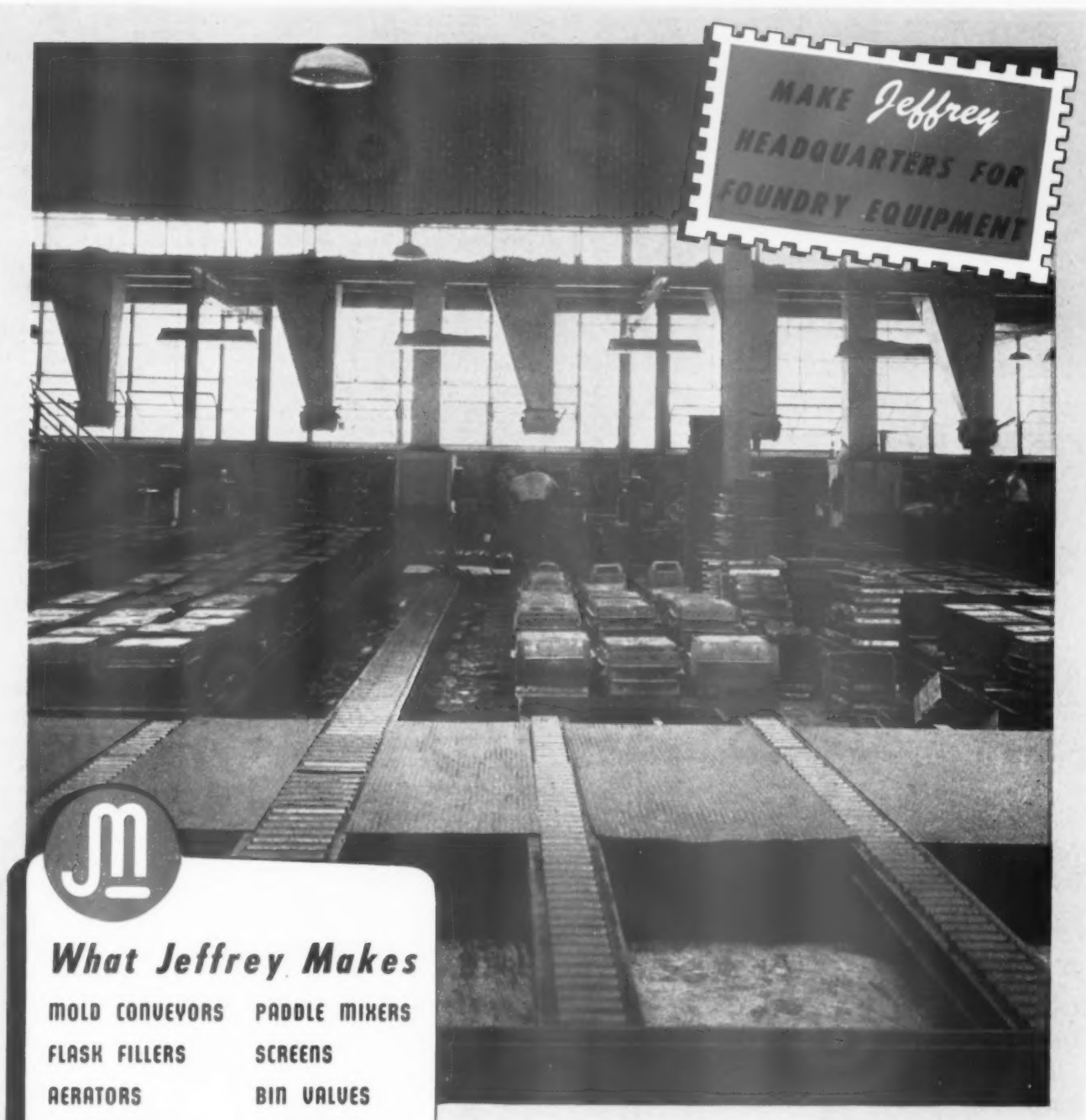
Use Minimum Amount

How much core oil shall be used? Use as little as possible to get the optimum baked bond from the core. Too much core oil and cereal binder increases not only the mixing time and baking time but also causes much smoke in the foundry and a more gaseous core. The actual amount of binder to be used in any mixture depends primarily on the type of binder chosen. There are weak core oils and strong core oils. If a weak one is employed, much more must be used than if a strong one is used. In general, under efficient foundry conditions, not more than 1.25 per cent core oil based on sand weight is needed.

Core oil is compatible with cereal binder. That is, they aid each other in the development of baked bond. Under some conditions the final strength of a core made with a combination of the two ingredients is greater than the sum of either one used alone. A ratio, by weight, of one part cereal to one part core oil in a sand mixture is usually satisfactory for both workability and baked strength.

Let us review some of the factors which we have discussed, by formulating our own core sand mixture. We need a good base sand so we procure 1000 lb of washed and dried Ottawa silica sand having grain fineness number of 60. We place this sand in a muller type of mixer and add 1 per cent, or 10

(*Continued on page* 196)



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MOLD CONVEYORS
PADDLE MIXERS
FLASK FILLERS
SCREENS
AERATORS
BIN VALVES
SANDITIONERS
CONVEYORS
BUCKET ELEVATORS

General view of large Jeffrey - equipped Foundry showing distributing belt conveyor, molders' hoppers and mold storage.

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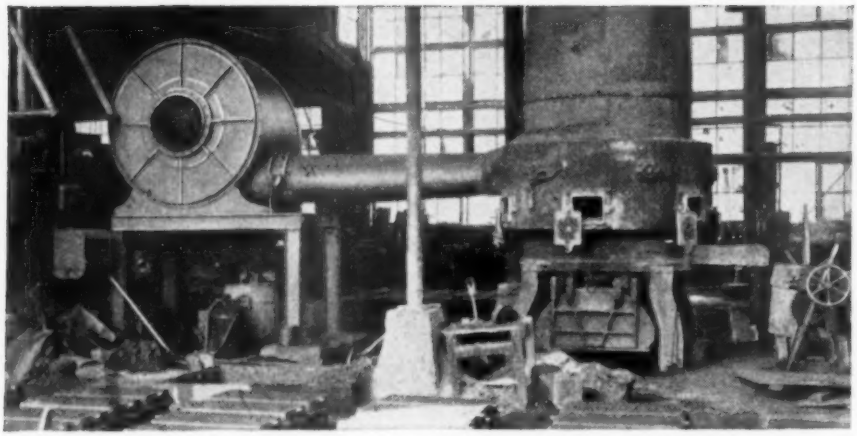

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THE SPENCER FOUNDRY TURBO

For more than forty years foundrymen everywhere have relied on the performance of the Spencer Turbo Compressor.

The very simplicity of the centrifugal design, with wide clearances, only two bearings, and no special foundations is part of its answer. The Spencer Turbo is inherently ideal for foundries because the volume and weight of air can be controlled by hand or automatically.

Air requirements for foundry cupolas are given in the Spencer Foundry Bulletin No. 112, and complete calculations for all Turbo applications including oil and as-fired equipment are given in the Spencer Turbo Data Book No. 107.

AND SPENCER VACUUM CLEANING

Overhead dirt and dust are easily removed from pipes, windows, structures and walls with Spencer Portable or Stationary Vacuum Cleaning Systems. Also valuable for reclaiming sand, cleaning molds, patterns and machinery.

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No. 127 ..... Turbo-Compressors
No. 109 ..... Gas Boosters
No. 112 ..... Foundry Blowers

332-A

SPENCER HARTFORD

THE SPENCER TURBINE CO.
HARTFORD 6, CONN.

(*Continued from page* 194)

lb, of a good cereal binder. We mix these ingredients for 2 minutes in the muller, after which we add approximately 2 per cent moisture. An additional 3 minutes of mixing time develops the green bond of this cereal binder and we are ready for the core oil addition. Adding 10 lb of linseed-base core oil (approximately 10 pints) we mull the ingredients for an additional three minutes. The core sand mixture is now ready for core making. It is delivered to the benches or blow machine where the core makers ram this mixture into coreboxes. The cores are stripped from the boxes and are placed on a rack in preparation for baking.

The next problem which arises is: At *what* temperature shall these cores be baked? The baking temperature of a core sand mixture is a function of (1) the grain size of the sand, (2) the amount of moisture in the core sand mixture, (3) the size and shape of the core, (4) the type and amount of binders used, (5) the efficiency of the core baking oven, and (6) the need for these cores in production.

Many Factors Affect Baking Time

The finer the grain size of the sand, the more the moisture, the larger the core, and the less efficient the oven—all contribute to longer baking time and higher baking temperatures.

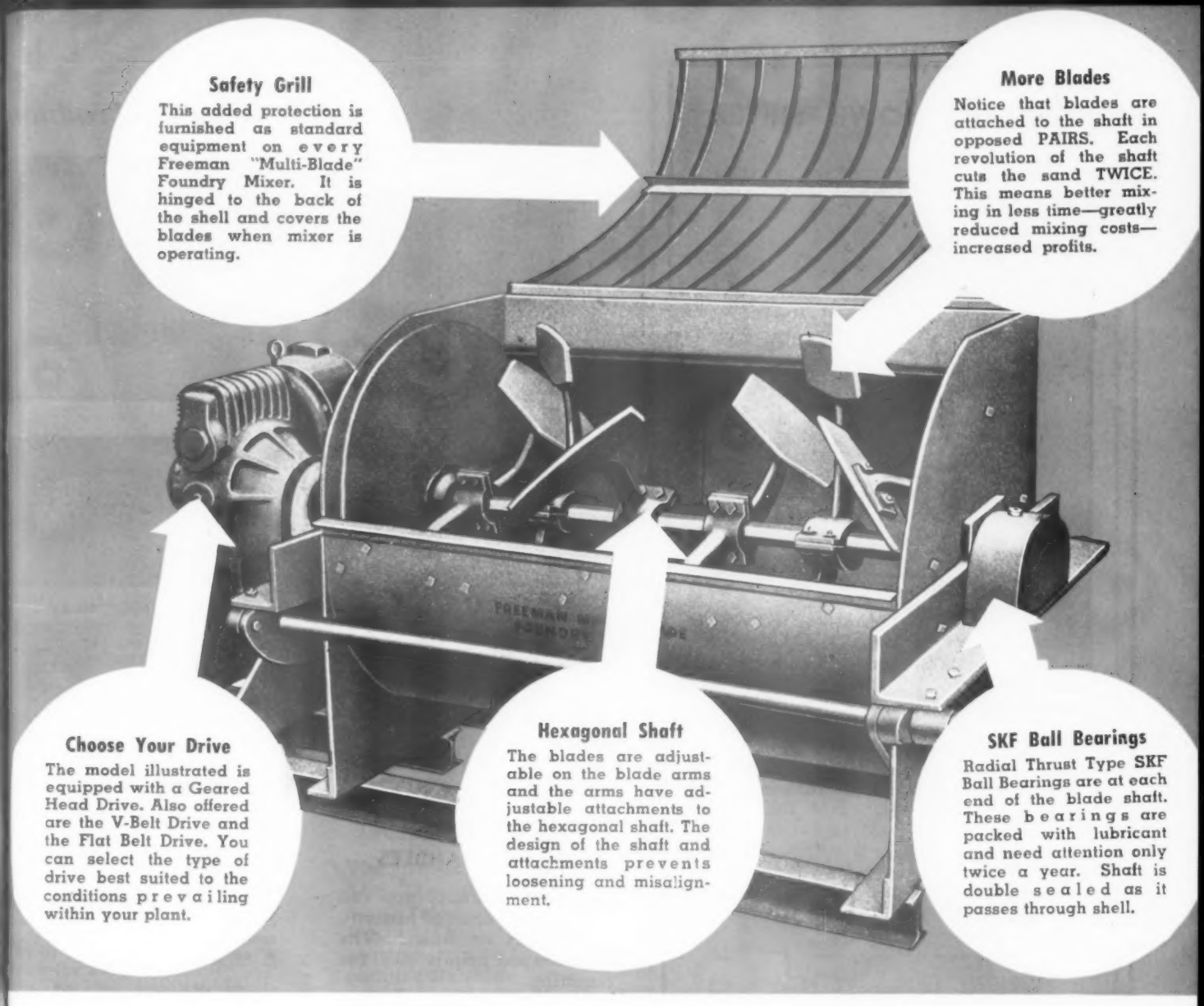
We have found that nearly the same tensile strength can be obtained from an AFA tensile briquet baked at any temperature from 400 to 475 F (inclusive) if the baking time be controlled absolutely. This means in effect that if the heat put into the cores is carefully watched, that the time element of baking can be used as a controlling factor.

For example, our firm's fast baking core oil will show a maximum peak tensile strength if baked for 105 minutes at 400 F in a controlled oven. If the temperature be raised to 450 F this same maximum strength can be obtained at approximately 75 minutes. If the temperature be raised another 25° to 475 F the same maximum tensile strength is present after about 45 minutes baking time.

On the other hand, if a slower baking core oil be used, the ultimate maximum tensile strength at 400 F may be 135 minutes instead of 105 minutes and it may take 75 minutes to obtain this same value if the temperature be raised to 475 F.

The optimum baking temperature for a cereal bond is from 325 to 350 F. However, a core oil usually requires a high baking temperature and most of the core oils on the market today bake best

(*Concluded on page* 200)


Safety Grill
This added protection is furnished as standard equipment on every Freeman "Multi-Blade" Foundry Mixer. It is hinged to the back of the shell and covers the blades when mixer is operating.
More Blades
Notice that blades are attached to the shaft in opposed PAIRS. Each revolution of the shaft cuts the sand TWICE. This means better mixing in less time—greatly reduced mixing costs—increased profits.
Choose Your Drive
The model illustrated is equipped with a Geared Head Drive. Also offered are the V-Belt Drive and the Flat Belt Drive. You can select the type of drive best suited to the conditions prevailing within your plant.
Hexagonal Shaft
The blades are adjustable on the blade arms and the arms have adjustable attachments to the hexagonal shaft. The design of the shaft and attachments prevents loosening and misalignment.
SKF Ball Bearings
Radial Thrust Type SKF Ball Bearings are at each end of the blade shaft. These bearings are packed with lubricant and need attention only twice a year. Shaft is double sealed as it passes through shell.

FREEMAN MULTI-BLADE FOUNDRY MIXER

Here is a mixer which has everything built-in as standard equipment, and includes many features not even available as accessories on other mixers. Send for a new booklet which explains how differently this mixer is built and just what you may expect of its operation in your plant.

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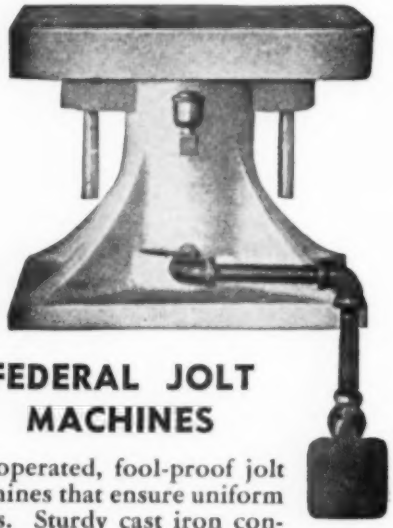
FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shovelling room. Write for information. Prompt delivery.



FEDERAL JOLT MACHINES

Air operated, fool-proof jolt machines that ensure uniform cores. Sturdy cast iron construction with no external valves to wear out. Made in four sizes. Get our prices and deliveries.

"All Federal Products Ar

FEDERAL S

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pean-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.

The "Lightning" Clamp

The "Holdtite" Clamp

Federal offers two types of flask clamps.
The "Lightning" clamp is an eccentric type, requiring no wedges and available in two sizes: No. 2, 8″ to 12″ and No. 3, 12″ to 20″.
The "Holdtite" is an adjustable clamp designed for use with wedges and is also offered in two sizes: No. 1, 13″ to 23″ and No. 0, 18″ to 33″.
Both clamps made of sturdy malleable iron, rigidly reinforced to prevent distortion.

MEMBER

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

SWABS—We have eliminated the shortage of this essential item by making them ourselves. Federal swabs are made of the best flax, ample in size and won't fall apart. They're fully eighteen inches long and full-bodied.
Shipped from stock — the supply is ample. Jobber inquiries are invited.

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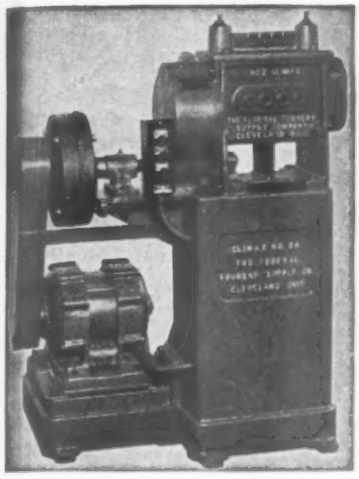
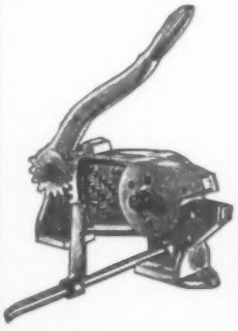


CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and re-using core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely — by unskilled labor. A complete descriptive circular is yours for the asking.

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.



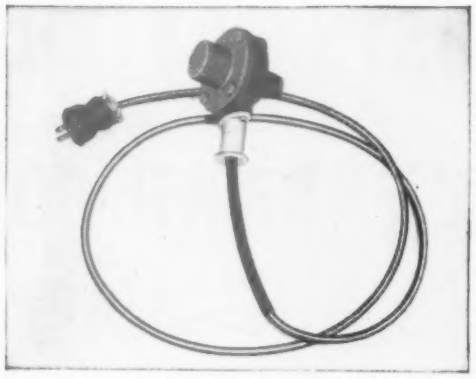
FEDERAL'S WONDER CUTTERS

Two compact cutters for rods and band iron. One cuts up to 5/8" round and the other to 7/8" round. Readily mounted on any bench. Users say they're worth their weight in gold!

WATER BRUSH

Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.

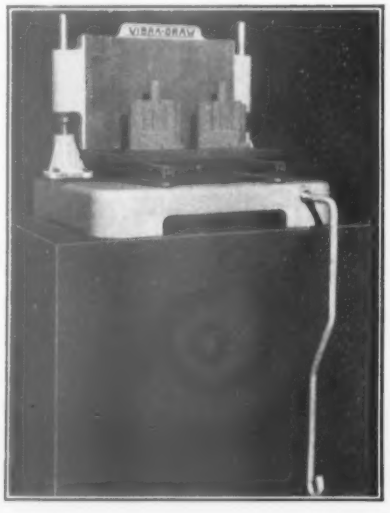
FEDERAL NO. 2 VIBRATOR



A popular size electric vibrator, made in our own machine shop and carried in stock for immediate delivery. Hard-chromed piston guarantees long life. For 110 volt, 60 cycle, single phase operation. $15.60 each, f.o.b. Cleveland. A companion knee switch of our own manufacture is also carried in stock; $3.60 each f.o.b. Cleveland.

FEDERAL'S "VIBRA-DRAW" CORE DRAWING MACHINE

Cuts costs in your core room by making it easy for every core maker to draw perfect cores as fast as he can fill the core box, place it against the vibrating head and lift the box. Made in two styles: the floor model and the portable bench model shown below. Immediate delivery—write for details.



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STANDARD CONVEYORS

WHERE volume handling of flasks, jackets, molds, sand and castings is required—Standard Conveyor Co. can aid you in holding handling costs down.

Standard makes a complete line of roller conveyors to meet every production foundry need.

The Standard Conveyor design of roller with either shielded or sealed bearings provides years of trouble-free operation under the most trying conditions. Their construction assures the smoothest handling and movement of molds and flasks from molding to pouring station and return. Varying combinations, widths, and weight carrying capacities are available to meet individual requirements.

Investigate Standard Conveyors for foundry applications — either in sections or in complete systems for every phase of ferrous or nonferrous foundry work. Ask for bulletin F-67.

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General Offices: North St. Paul 9, Minn.
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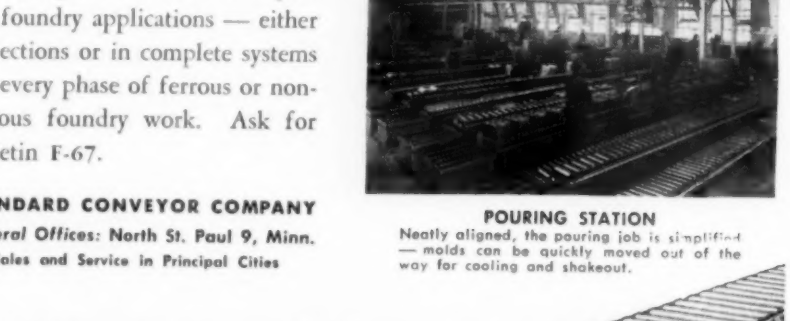
MOLDING FLOOR
When molding's complete — loaded on conveyors — jobs move smoothly and quickly to next stop.

STORAGE
All lined up — ready for pouring and moving to shakeout and return to molders.

POURING STATION
Neatly aligned, the pouring job is simplified — molds can be quickly moved out of the way for cooling and shakeout.



ENGINEERED FOR FASTER PRODUCTION

(*Concluded from page* 196)

at 425 F in an efficiently controlled baking oven.

The method that we use to evaluate the relative speed of a baking core sand mixture is to actually determine the psi tensile strength per degree F per minute. The greater this value the more rapidly a core sand mixture will bake. A normal mixture containing 100:1 sand-to-oil ratio will show a rate of 0.005 psi per degree F per minute at its optimum baking temperature.

Returning from this digression, we can say that a normal core sand mixture, such as the one we have chosen, should be baked at approximately 425 F for 75 minutes per square inch of cross section. If the cores be baked for this time and temperature they should be the strongest and hardest cores economically obtainable. However, it is usual practice to slightly over-bake a core in order to be certain of all the possible volatile matter being evolved and to increase the ease of collapsibility during founding.

It must be remembered that the information cited here represents ideal conditions; a phenomenon never found in a general foundry. The baking time and temperatures are usually dictated by foundry conditions rather than by technical data.

Scrap and Pig Iron Consumption Rises

Total consumption of scrap and pig iron reached 8,872,000 gross tons in January, the highest since May, 1945, according to the Bureau of Mines, U. S. Department of the Interior. This was 22 per cent over the 7,256,000 tons used in December. Greatest portion of this increase was in pig iron—1,026,000 tons over December.

Consumption of purchased scrap increased 7 per cent, home scrap increased 24 per cent and pig iron 30 per cent over December. Gray iron foundries used more scrap and pig iron in January than in any other month since October, 1941.

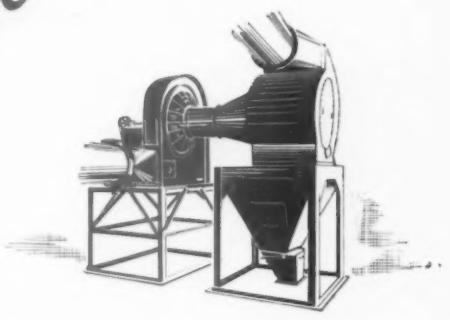
Association Issues Bulletin

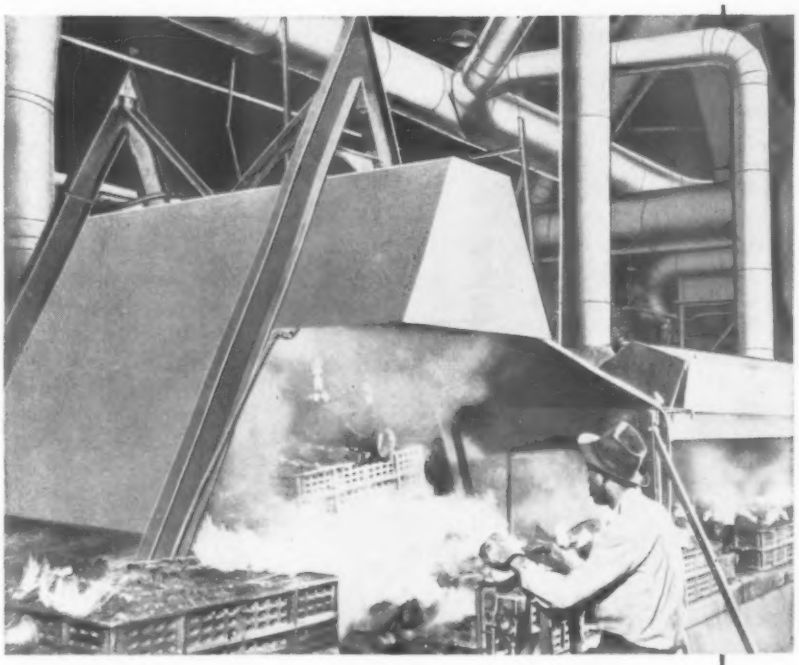
Foundry Equipment Manufacturers Association Inc., Engineers Building, Cleveland 14, has published a 24-page bulletin of interest to its members and friends in the foundry industry. The booklet contains a history of the organization, officers and committees for the current year, former presidents, constitution and by-laws, annual report and membership roster by company and product. A limited number of copies may be obtained on request to the executive secretary, Arthur J. Tuscany.

The more they Mechanize
The more they Modernize

WITH

ROTO-CLONE





ONE man at the levers controls the complete cope shakeout operation in this large automotive production foundry. But with the solution of one problem another was created. Mechanization meant a greater concentration of dust at the point of shakeout. What method of dust control could best handle this increased volume without interference to the mechanical handling system?

Use of overhead type hood and a Type W Roto-Clone with Precleaner proved the solution. A greater dust load was removed efficiently and the reduced air requirements of the overhead hood resulted in lower equipment cost.

The Type W Roto-Clone is a wet type collector, discharging the collected material as a slurry or sludge. It is designed to handle heavy concentrations of fine abrasive dust containing moisture or steam. Where heavy dust loads are encountered, the Type W Roto-Clone is supplied with Precleaner which removes the bulk of the dust before the final fraction is precipitated by the Roto-Clone.

When mechanizing shakeout or sand conditioning operations, plan to include Roto-Clone dust control. There's a Type W Roto-Clone of a size and arrangement to fit your specific layout. Write for Bulletin 270-A and name of nearest AAF representative.

AMERICAN AIR FILTER COMPANY, INC.
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AAF

ROTO-CLONE
DUST CONTROL EQUIPMENT

OFFICERS AND DIRECTORS

Elected at AFA Business Meeting

MAX KUNIANSKY, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., was elected president of the American Foundrymen's Association for 1947-48, and William B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, Pa., was named as vice president, at the annual business meeting held during the recent Detroit convention.

Directors to serve three-year terms include: E. N. Delahunt, general superintendent, Warden King Ltd., Montreal; William J. MacNeill, general manager, G. H. R. Foundry Division, Dayton Malleable Iron Co. Dayton, O.; Russell H. McCarroll, director of chemical and metallurgical engineering and research, Ford Motor Co., Dearborn, Mich.; John M. Robb Jr., resident manager, Hickman, Williams & Co. Inc., Philadelphia, and A. C. Ziebell, president and treasurer, Universal Foundry Co., Oshkosh, Wis.

Sheldon V. Wood, president, Minneapolis Electric Steel Castings Co. Minneapolis, retiring president of the association, was elected a director to serve one year. New officers will take office at the annual meeting of the board in July.

Max Kuniansky

MAX KUNIANSKY, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va., is known internationally for his contributions to the advancement of castings industry technology, particularly in the field of gray iron metallurgy, and for his extensive activities in the work of the society. A member of the AFA since 1921, he has served as vice president and member of the executive committee for the current year and was a director for three years, 1943-46. Mr. Kuniansky has been outstandingly active in the Gray Iron Division and investigational groups of the association, and has served on the Gray Iron Castings, Pig Iron Qualities, Recommended Practices for Cupola Mixtures and Cupola Research Committee. He has also been an active member of the Chesapeake Chapter of the AFA, of which he has served as a director. His valuable contributions to the gray iron castings industry and to the co-operative, technical work of the association were recognized in 1941 when he was awarded the William H. McFadden Gold Medal of the AFA

Mr. Kuniansky was born in Russia and came to this country in 1907. He attended the public schools of Atlanta, Ga., and was graduated from the Georgia school of Technology in 1919 with a degree in engineering chemistry. From 1917 to 1923 he was connected for varying periods with the former Aetna Explosives Co., now Hercules Powder Co., at its Birmingham and Ishpeming, Mich., plant; with the Chicago plant of National Malleable & Steel Castings Co., and with American Cast Iron Pipe Co., Birmingham. In 1923 he became chief chemist of Lynchburg Foundry Co., and in 1928 was appointed works manager of its Lynchburg and Radford, Va., plants. Later he became assistant manager in charge of operations, and 1934 he was named general manager. He has been vice president and genaral manager since 1943.

William B. Wallis

WILLIAM B. WALLIS, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, has been active in the affairs of the association and has served as a national director since 1943. He was born in Pittsburgh and, following graduation from Pennsylvania State College in 1911, he became associated with the consulting engineer on the Cheat River hydroelectric development of West Penn Power Co., Pittsburgh. The next year he spent in Idaho with the Great Shoshone & Twin Falls Power Co., and returned to Pittsburgh in 1913 as assistant to the vice president in charge of operations of that company. Later he became assistant sales manager for West Penn Power Co., a post he held until 1915 when he joined W. E. Moore & Co., Pittsburgh, as a consulting engineer. In 1920 he resigned as assistant general manager of Jessop Steel Co., Washington, Pa., to become president of Pittsburgh Lectromelt Furnace Corp. Mr. Wallis is a member of the Electro-Chemical Society, American Iron & Steel Institute, American Institute of Mining and Metallurgical Engineers, the Canadian Institute of Mining and Metallurgy, American Society for Metals, and the American Society for Testing Materials.

E. N. Delahunt

E. N. DELAHUNT, general superintendent of Warden King Ltd., Montreal, war born in Chester, Pa., and was graduated from Catholic University, Washington, in 1917, with a degree in mechanical engineering. Following two years of military service during World War I, which included 10 months in France with the 79th Division, he joined the Bridgeport, Conn., division of Crane Co., as assistant to the factory engineer. In 1928 he was transferred to Crane Ltd., Montreal, as factory engineer in charge of the rebuilding of the Warden King Ltd. Division. He was plant superintendent of Warden King Ltd. in 1928 and general superintendent in 1945. Mr. Delahunt was a member of the committee which organized the Eastern Canada-Newfoundland Chapter of the AFA, and served as its chairman in 1943-44.

William J. MacNeill

WILLIAM J. MACNEILL, general manager of the G. H. R. Foundry Division, Dayton Malleable Iron Co., Dayton, O., was born in Lake Mills, Wis. He was graduated from Indiana University in 1919 and received his master's degree from University of Wisconsin in 1926. He entered the foundry industry in 1919, with Federal Malleable Co., West Allis, Wis., and resigned as president and general manager of that organization in 1945 to become general manager of the G. H. R. Foundry Division, Dayton Malleable Iron Co. An active member of Wisconsin Chapter of the AFA, he served as its president in 1939.

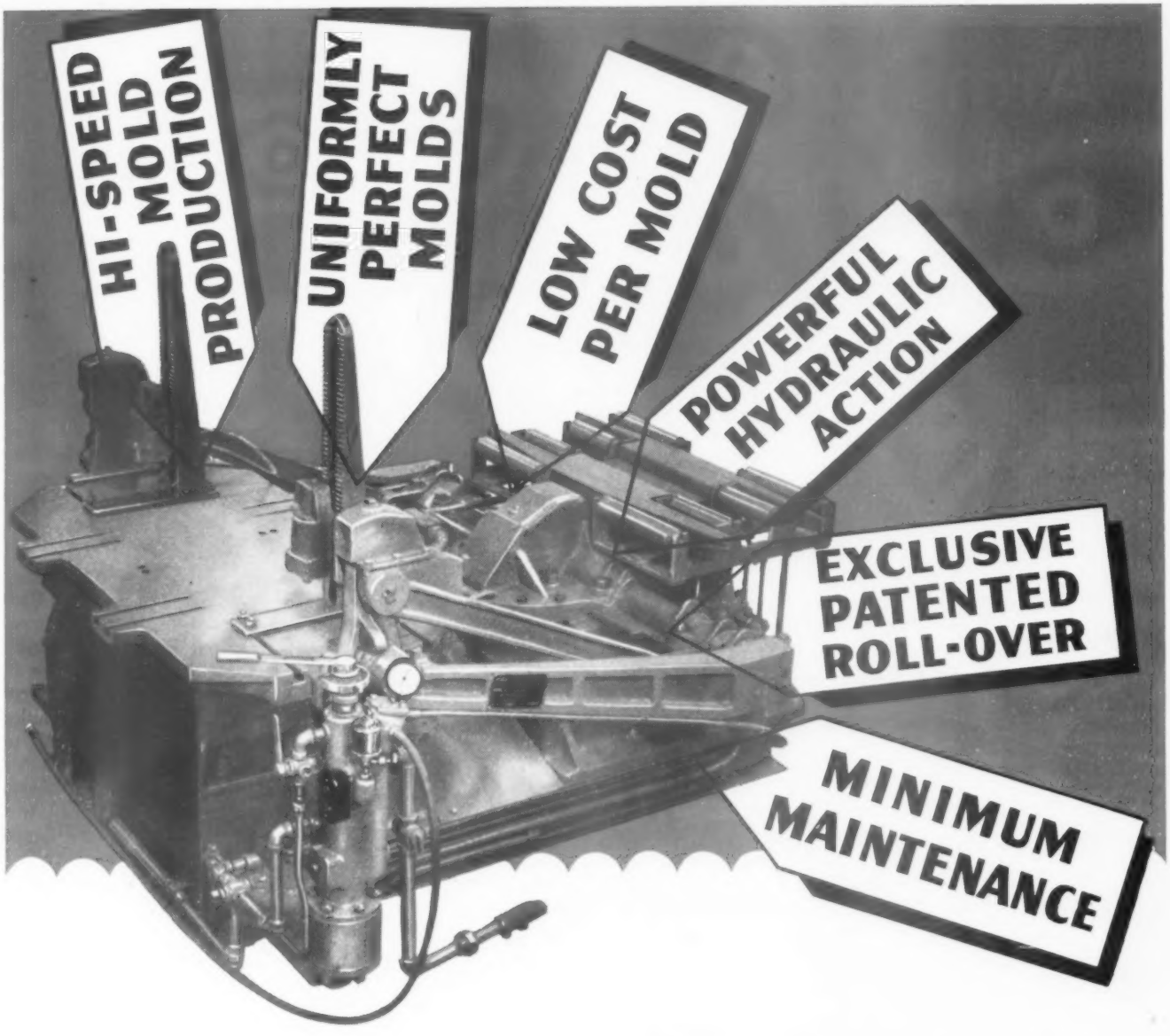
Russell H. McCarroll

RUSSELL H. MCCARROLL, director of chemical and metallurgical engineering and research, Ford Motor Co., Dearborn, Mich., is a native of Detroit. He was graduated from University of Michigan in 1914 with a degree in chemical engineering, and was granted an honorary degree of master of engineering by that university in 1937. Mr. McCarroll became associated with Ford Motor Co. in 1915. In 1918 he was in charge of chemical engineering at the Rouge plant, and from 1922 to 1944 was in charge of that department for all Ford plants. He is a member of the Detroit Chapter of the AFA, American Chemical Society, American Society for Metals, British Institute of Metals and the American Welding Society, as well as a director of the Engineering Society of Detroit and a member of the technical board of the Society of Automotive Engineers.

John M. Robb Jr.

JOHN M. ROBB JR., resident manager of Hickman, Williams & Co. Inc., Philadelphia, was born in Philadelphia and attended the business school of Temple Unversity. He was associated with Park & Williams Inc., Philadelphia for 11 years as a pig iron salesman, and in 1931 joined Hickman, Williams & Co. Inc. as a salesman in the Philadelphia territory where he is now resident manager. A member of the former Philadelphia Foundrymen's Association, he is a charter member of the Philadephia

(*Concluded on page* 204)



Choose your molding equipment with a view toward maximum returns in minimum time and you will choose HERMANS.

In no other line will you find so many exclusive, time-saving, money-making features.

Herman Molding Machines rapidly produce great volumes of *uniformly perfect molds* at low cost. Only Herman gives you the patented roll-over action that provides a complete 180° roll-over with power applied on only 90° of the roll.

Herman Molding Machines have more than forty years of molding machine specialization and research to support their outstanding design features. All machines employ fast, sure, powerful, steady hydraulic power applied to produce greatest effort at minimum power-cost. Even the large 70-Ton jar-rammer requires only 80 lbs. air pressure.

Get complete details. A Herman engineer will be glad to call on you and discuss your problems.

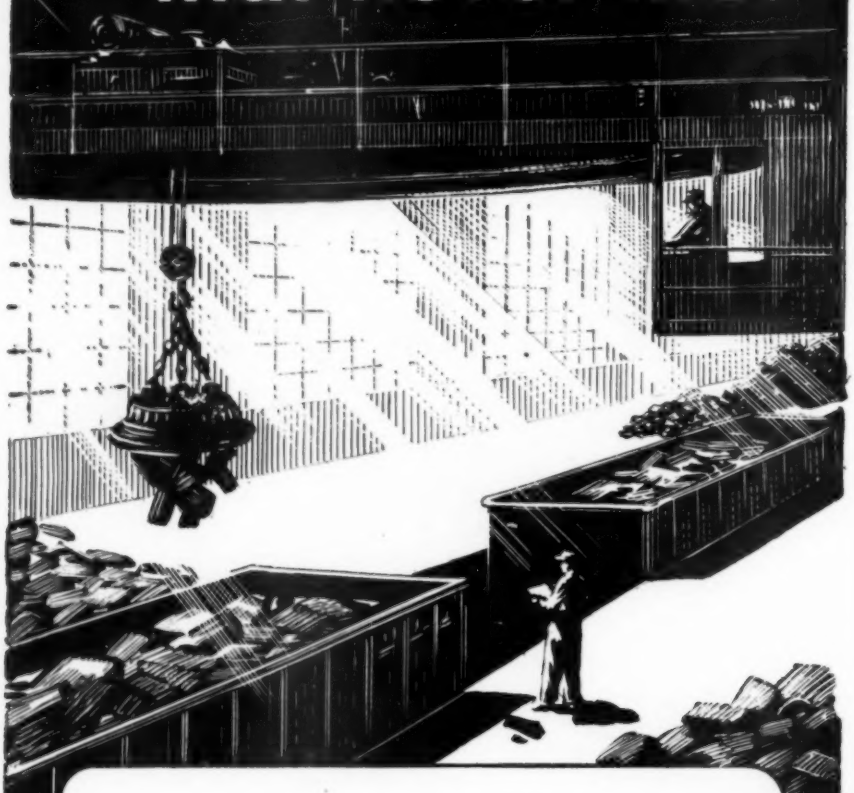
MEMBER

MANUFACTURERS' ASSOCIATION, INC. FOUNDRY EQUIPMENT

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

Arms and Legs that never tire!

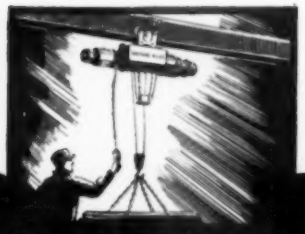


In heavy industry, loads to lift, move and deposit are reckoned in tons. No human muscles can endure such work day after day and year after year.

Shepard Niles electric cranes, made by America's oldest builder of electric cranes and hoists, are made in styles and sizes to take care of every heavy handling job—and to do it smoothly, easily, safely, economically and efficiently.

There's a type Shepard Niles crane to solve *your* handling problem. Trained, experienced Shepard Niles engineers, familiar with the requirements of thousands of crane users, will gladly study your needs and recommend, without obligation, the crane best suited to do your job.

A Shepard Niles crane of the right type will help you enjoy competitive advantages not possible without the best material handling equipment



If your handling loads start with an eighth ton, why not look into the advantages of a Shepard Niles electric hoist? There are over 5,000 styles and sizes from which to select. There's one to fit your needs. Ask us to help you select it.

Shepard Niles
CRANE & HOIST CORPORATION

360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

(*Concluded from page* 202)

Chapter of the AFA which he has served as a director and vice chairman, and as chairman during 1945-46.

A. C. Ziebell

A. C. ZIEBELL, president and treasurer, Universal Foundry Co., Oshkosh, Wis., was born in Appleton, Wis. He was associated with Universal Motor Co., Oshkosh, Wis., as an engineer, until 1916, when he became secretary and general manager of Universal Foundry Co. He has been president and treasurer of that company since 1936. Mr. Ziebell has been a member of the Foreman Training Committee of AFA since 1941 and is an active member of the Wisconsin Chapter of the AFA, which he has served as secretary and vice president and as president in 1941-42.

Sheldon V. Wood

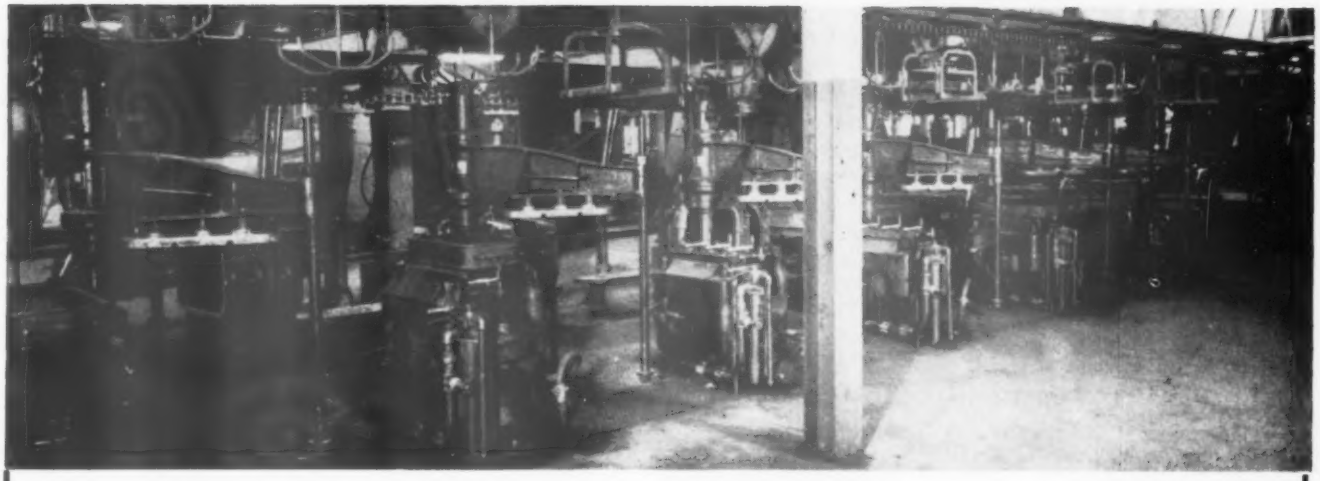
SHELDON V. WOOD, president, Minneapolis Electric Steel Castings Co., Minneapolis, was born in Jefferson, Iowa, and was graduated from the University of Minnesota in 1904 with a degree in engineering. He began his business career as a mining engineer with Butler Bros., Hibbing, Minn. From 1905 to 1907 he was engaged in engineering work with the Great Northern Railway, St. Paul, and from 1907 to 1912 was sales engineer with Olds Gas Engine Co., Lansing, Mich. He joined Minneapolis Electric Steel in 1913, as manager, later becoming president. Mr. Wood was active in organization of the Twin City Chapter of the AFA, which he has served as a director. He was a national director of the AFA in 1942-45, vice president and member of the executive committee in 1945-46, serving the current year as president.

Foundry Employment Outlook Surveyed

Report, "Employment Outlook in Foundry Occupations," has been published by the U. S. Department of Labor. Copies are available for 15 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington 25.

Part one of the report covers the outlook for foundry employment and includes a description of foundry products and processes, economic characteristics of foundry operations, trends in foundry production and employment, the outlook for production of castings and technological trends affecting employment.

Part two covers the outlook in foundry occupations and includes a description of the general characteristics of the foundry labor force and the employment outlook for the various foundry jobs.

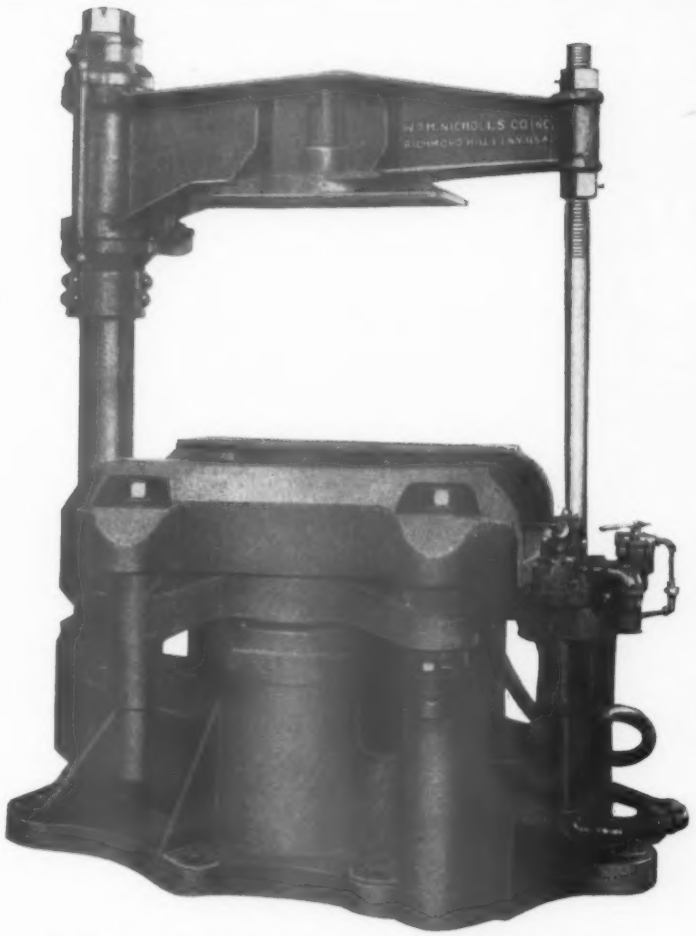


A Battery of Nicholls 16" Heavy Duty Machines

Nicholls' Molding Machines

Preferred by the Largest Foundries . . .

REDESIGNED to a minimum of working parts; thereby greatly reducing maintenance cost and, at the same time lowering operating costs through the saving of labor. The crossarm is equipped with a parallel squeeze plate which considerably reduces the amount of crossarm travel; resulting in faster operation and less effort required. The open end frame allows for flexibility in pattern lengths. Quick acting, yet so simple to operate that unskilled labor can be taught to make molds in record time.



#18-44 Type "K" Heavy Duty Jolt Squeeze and Pattern Draw Molding Machine, with open end frame and parallel squeeze plate, 18" diameter squeeze piston and 8" diameter jolt piston.

Wm. H. NICHOLLS Co., Inc.

RICHMOND HILL, LONG ISLAND, NEW YORK

ESTABLISHED 1910

Foreign Manufacturers and Selling Agents—

For Continental Europe and Great Britian—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

NICHOLLS

The adventures of BILL

By PAT DWYER

Drawings by RICHEY

WHILE dozing comfortably in a cushioned rustic chair under the shade of a noble tree in what euphonistically is known among ourselves as the back lawn, I suddenly came out of a realistic dream. A huge python, mentally estimated at 40 ft in length and at least 15 in. in diameter for the greater part of that length, had slid down silently from the tree at my back, flung himself around me in a closely coiled spiral that started to contract at an alarming rate. I could not jump. I could not loose my arms. I could not yell. When my eyes popped open through fright and pressure I discovered a cute little lady curled in my lap, with one arm clinched around my neck, and the hand attached to the other arm rooting through all my pockets.

"My dear," I whispered, "you saved my life. You can keep anything you find in my pockets."

"If that's all your life is worth," she said, "you must be feelin' mighty low." In the latter half of the sentence she made a valiant effort to imitate the bass tones of the radio artist whose rendition of this side-splitting remark never fails to arouse a storm of applause.

"Yes sir," she continued indignantly, "you are practically a dead loss on the hoof. All I can find in your pocket is a hole!"

"Many years ago," I said, "when your father and your uncles and your aunts were going through your present predatory stage, I developed a bit of simple strategy that stood me in good stead. Before retiring for a bit of a nap under a tree or elsewhere I prudently transferred the scanty contents of my pockets to a pocket in my little red vest and then hung the little red vest on a secret nail in the attic.

"However," I said, as she prepared to scramble off my lap with the evident intention of exploring the attic, "as an everloving grandfather with your welfare deeply at heart I think it is only fair to warn you of certain hazards involved in the scheme which I am morally certain is buzzing around in your crafty little mind. The stairway is there. The little red vest is there and I am not standing in your way. If you gallop right up, nothing will happen to you. But if at any stage of the journey you look back over your shoulder—and I am reasonably certain your curiosity or your conscience will prompt a backward glance—the vest will vanish and you immediately will be transmogrified into a pillar of salt like Lot's wife in the Old Testament."

"Lot? Was that his first or his last name? I never heard you mention him before. If his name is in the Old Testament I suppose he was one of the old gang who worked with you in the foundry."

"No. He did not work with me in the foundry. I won't deny but that, at one time or another, I toiled under the same roof with some remarkable characters—hearts of gold of course and all that kind of thing, including cast iron stomachs and auxiliary plumbing—but Lot and I never happened to have a card in the same Local. A current, but unfortunately unconfirmed tradition among New Engiand foundrymen, is that Lot and the late Job Goostray were at one time doubled up on the job of casting the anchors for Noah's Ark at the old Norway Iron Works in South Boston. Job never claimed this distinction. The nearest he came to it on one occasion was the admission that the molder in question might have been his grandfather, a Lancashire lad who ascribed his venerable old age to his prudent custom of wearing hob nail wooden clogs, a sleeved and quilted waistcoat and a heavy woolen scarf in any and all weather."

"So now we are back again to the little red vest. What happened to Lot and Mrs. Lot and all the little Lots, if any?"

"No little Lots in this story with the exception of two infants who-er-kind of creep in near the end of the story in a slightly unorthodox manner. Unorthodox is a rare old Irish word meaning in a general way that the subject is a little too deep for a person of your age. A few years from now you might take it up with your mother, and I'll thank you my dear to leave my name out of the discussion. If you happened to ask Bill's old

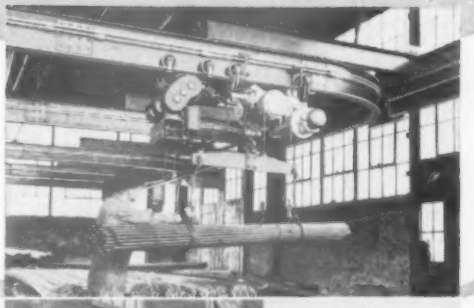
(*Continued on page* 208)

Old debaters will be interested in this answer to the old conundrum: Who put the salt in the sea?

MONORAIL PAYS!!

PRODUCTION INCREASE
From 26 to 48 tons per day.

By furnishing definite overhead routes for the movement of bar stock, congestion was eliminated. Free flow of materials to production machines nearly doubled their output.

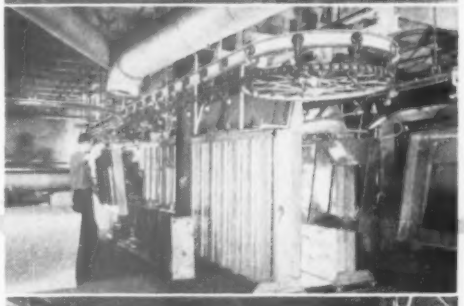


HANDLING COST
Saving of $150 in 4 months.

Transfer of sheet metal from truck to storage is costly when handled sheet by sheet. A simple system such as this actually saved $150 in handling cost within four months.

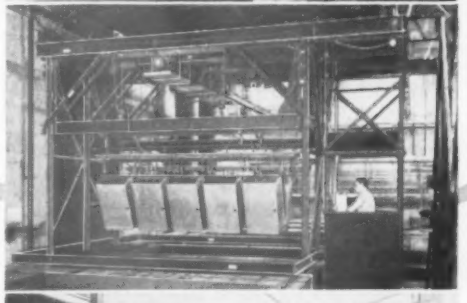
TIME SAVED
Drying time reduced 70%

Passage of metal furnace parts through infra-red dryers cuts 70% from the time formerly required for drying. This operation on monorail also eliminates costly handling labor.



INCREASED CAPACITY
30% more units moved through process

Nearly a third more units can be handled from tank to tank throughout the cleaning process. All handling is controlled from cab by a single operator.



LABOR SAVED
Unloads truck with 26 less man hours.

Operators claim to save $20 per truck over former unloading costs. With power operated equipment and special grab for handling 2-ton loads, complete safety is assured.

Let an American MonoRail Engineer explain how similar savings can be made in your handling methods. Write for Bulletin C-1 showing successful applications.

THE AMERICAN MONORAIL COMPANY

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SKY-WAY to PRODUCTION PROFITS

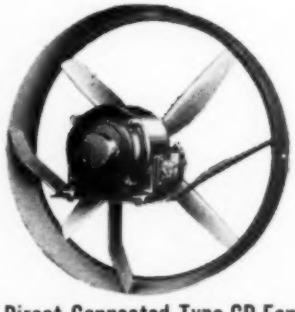
Propellair VERTI-STACKS Clear the Air for Action

For *more* and *better* foundry production, and *less* labor turnover—get rid of smoke, dust, heat, and fumes with powerful Propellair Verti-Stacks. These power roof ventilators are simple, sturdy; give years of *trouble-free* operation—pay for themselves many times over.

Butterfly dampers open wide the instant fan is started; offer virtually *zero* resistance as discharge shoots high above roof; close completely and automatically. Double-action fan efficiency gives powerful suction. Propellair airfoil-section blades actually *pull more air* than they push, distribute the load *evenly* from hub to blade tip.

USE PROPELLAIR FOR RESULTS

Propellair foundry ventilating equipment has proved its dependability and economy under operating conditions of every kind. Types and sizes for every service—for mounting in ducts or stacks, in walls or windows, or upon floor stands or pedestals. Compact, functional designs save space, boost output. Write today for full information.



Direct-Connected Type CD Fan

PROPELLAIR

DIVISION OF ROBBINS & MYERS • INC.

SPRINGFIELD • OHIO

(*Continued from page* 206)

uncle Malachi for an explanation, he would wag the old bush and tell you 'If ye don't ax nobody no questions, they won't tell ye no lies.' "

"Well, well!" says she in the standard radio technique with which she is afflicted, "if here isn't Bill, himself in person. Welcome to our program, stranger. If you'll excuse me for a few minutes I am going to play with my dollie up in the attic."

"What's her hurry?" Bill inquired suspiciously. "I hope you are not trying to inject large gobs of grown-up wisdom into an innocent little head, or indulging in any other form of cruel and unusual torture."

"You can make your mind easy. The inspired writer who admonished his hearers to combine the simplicity of the dove with the wiliness of the serpent would be delighted to meet that little wildcat. When she wants to listen, she usually is two jumps ahead of you. When she does not choose to listen, she's a-a-." "A pain in the neck. You don't need to tell me. Always at least one in every family. To what do you ascribe her total lack of hearing on this occasion?"

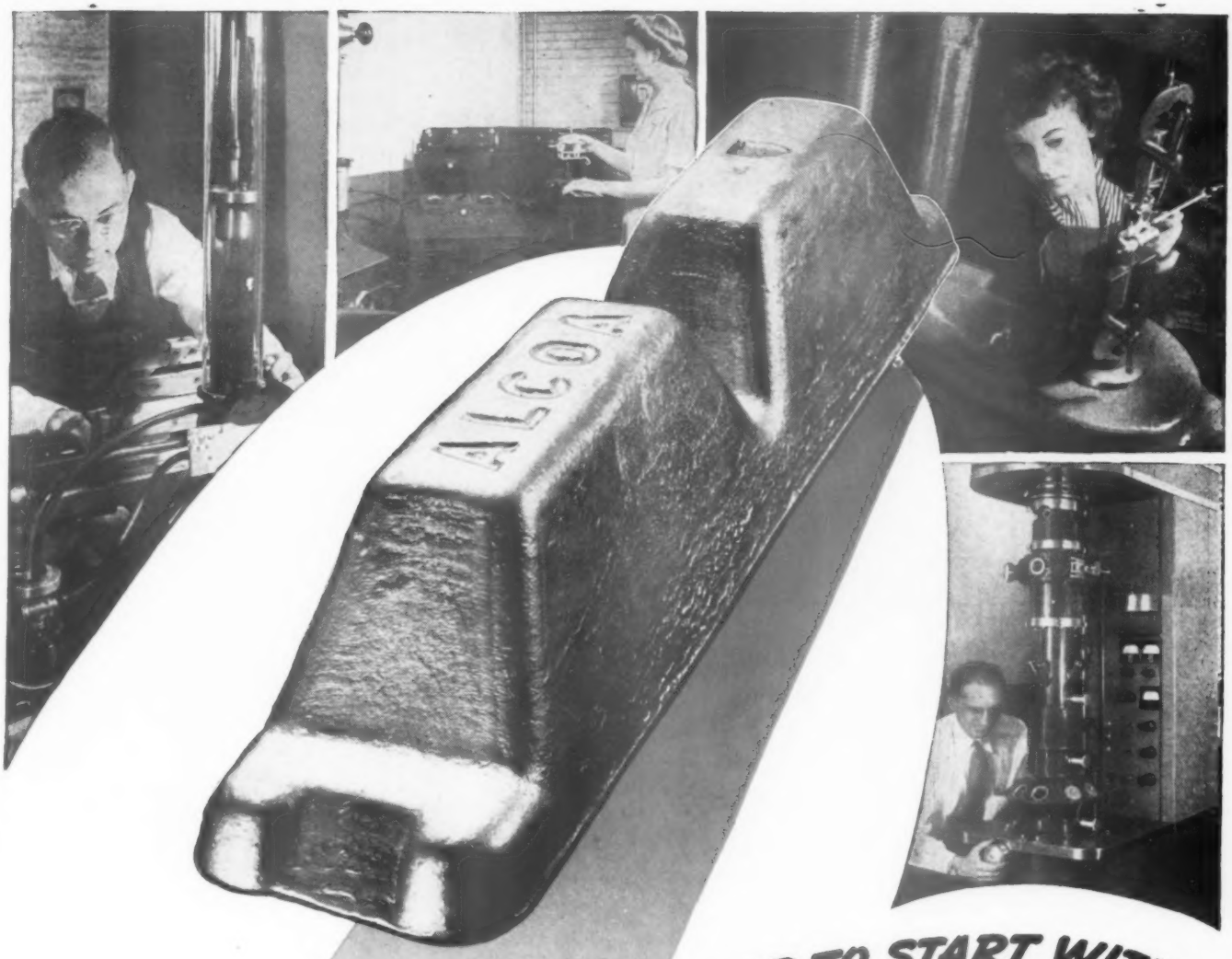
"I started to tell her the story of Lot—"

"You mean the old guy who was evicted, told to get out and keep going before the wicked cities were destroyed by fire and brimstone? He was told that if he could find 50 decent men in the town, the verdict would be changed. Later the offer was reduced to 40, 30, 20, 10 and finally to 5. He couldn't find 5 and out he had to go. He gathered up his wife and two daughters, a collection of camels, sheep, goats and one thing and another and headed for the mountains with strict orders to look straight ahead."

"No need to go into details. I have read the story. Mrs. Lot looked back over her shoulder and immediately was turned into a pillar of salt. No long drawn-out court trials in those days. You did what you were told, or else. Seems to me a bit of the old stern technique might be adopted in these modern days to blow the dust and cobwebs out of our court proceedings. Unfortunately, I don't suppose any modern judge could do the great salt trick of turning a lady into a pillar of salt. Apparently that is one of the lost arts."

"Well," said Bill, "I wouldn't say that. A good bit of turning is still going on. Men and women driving automobiles think nothing of turning into side streets, driveways and garages. Every day people turn into doorways, public and private buildings. The term has

(*Continued on page* 210)



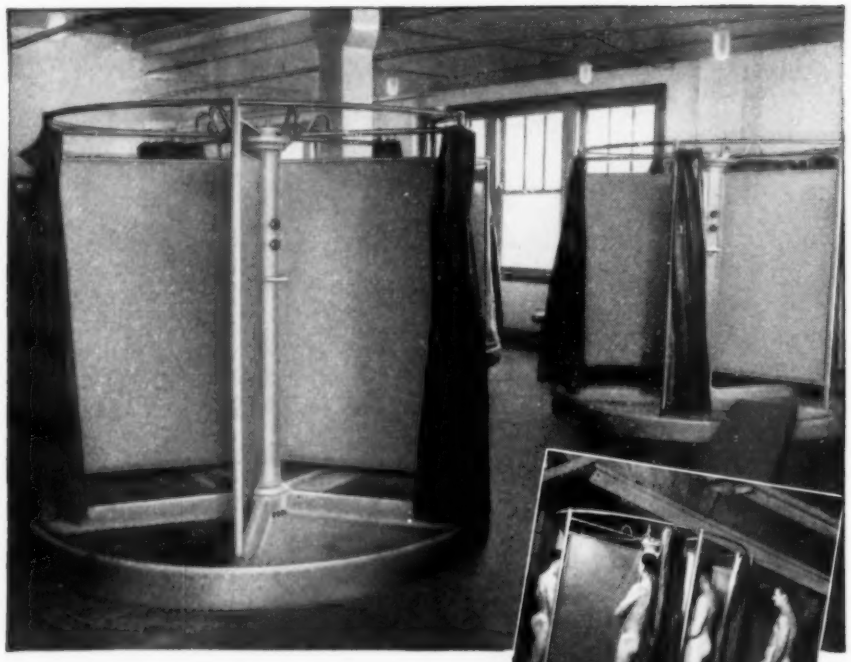
Just to make sure it's **BETTER TO START WITH**

Here, in the Aluminum Research Laboratories at New Kensington, Pa., are many chemists, metallurgists, engineers, working with the finest of modern equipment. The realistic urge is to make better aluminum, to warrant the confidence of foundrymen everywhere in the quality of the Alcoa Pig and Ingot they buy . . . "Better to Start With", their castings will be better at final inspection. ALUMINUM COMPANY OF AMERICA, 1823 Gulf Building, Pittsburgh 19, Pa.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM



SANITATION
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THESE ADD UP TO—

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Employee wash facilities, to be complete, require some form of shower convenience, for workers like to leave the dirt and grime of their jobs behind them when the day's work is over. Modern progressive industries, recognizing this need, have selected Bradley Multi-Stall Showers for maximum sanitation, economy of operation and long-life durability. Employers also report that such installations keep necessary wash-up *time* to a minimum.

One Bradley 5-Stall Shower unit requires only 3 plumbing connections in comparison to 15 needed for 5 "single-stall" units. This simplified installation plus complete absence of corners and dirt-collecting pockets cuts cost of upkeep and janitor detail. Savings are also realized through lower hot water costs made possible by reduced water consumption.

Whether you are building a new plant, modernizing an existing structure or expanding present facilities, Bradley 5- or 3-Stall Shower units can be installed quickly and easily on any kind of floor including wood. BRADLEY WASHFOUNTAIN CO., 2217 W. Michigan Street, Milwaukee 1, Wisconsin.

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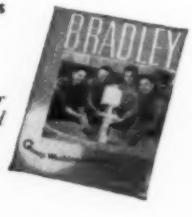
BRADLEY multi-stall showers

Send today for new illustrated Catalog 4701.

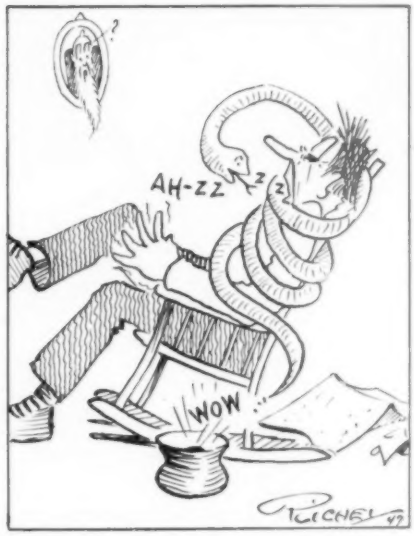


(*Continued from page* 208)

fallen somewhat into disuse in recent years, but at one period whenever a beautiful girl passed by, the fathers of the present generation of noisy, undisciplined and vulgar young wolves all turned to rubber!"

"'For ways that are dark and for tricks that are vain,' I should say that the heathen Chinee has no monopoly on being peculiar—"

"Seems to me I heard that before some place. However, your reference to our Oriental friends reminds me of the Detroit convention small cupola session I was telling you about the last time I was over here. The second contribution to the discussion came from a lad who said he had the dope from Frank Foster. In his early boyhood Frank had played in and around the famous plant of Baxter D. Whitney, Winchendon, Mass., where



The $64 question. Who swallows who?

his father was a machinist. Later he served an apprenticeship in the machine shop of the Chase Turbine Mfg. Co., Orange, Mass. About the turn of the century he went to China in a supervisory capacity with a technical school. About 20 years ago he contributed a series of articles to THE FOUNDRY dealing with conditions in China. I mention these items merely to indicate that through training and experience he was qualified to discuss the subject.

"The type of cupola used by the Chinese probably has been in use for at least 1000 years or more and is used in all parts of the country. That means several hundred years before the idea percolated to western Europe near the close of the 18th century. According to published records the first cupola in America did not appear until 1820. Iron was melted and poured into molds before that date, but it was not melted in a cupola.

(*Continued on page* 212)

SPEED UP

those clean-up jobs

with a Thor

Model 7B with push throttle. Also available with button or lever throttles.

pneumatic

WELD FLUX SCALING HAMMER

This power-packed Thor Hammer saves time and money on many jobs. Use it for fast, low-cost removal of flux after welding, chipping, chiseling, scaling, etc. Its got plenty of speed and power for quick, better results. Air blast keeps work surface visible by blowing away chips, scale and dirt. *Ask your nearest Thor branch to arrange a demonstration.*

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Thor PORTABLE POWER TOOLS

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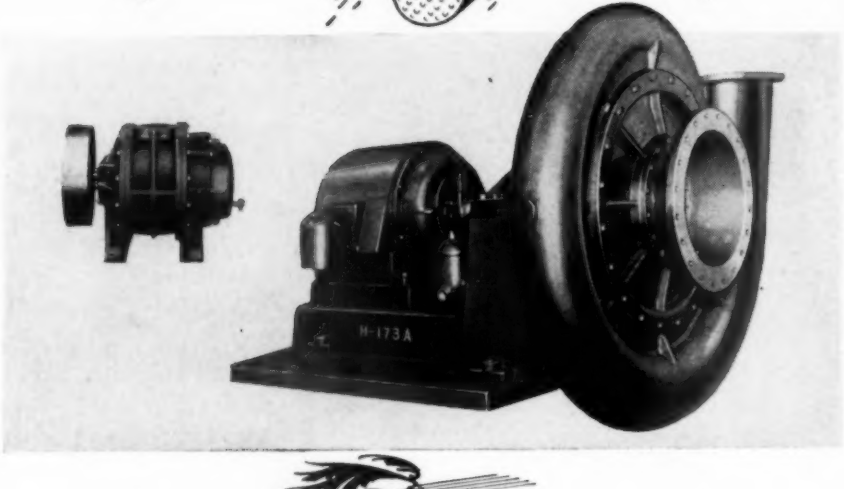

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From our wide range of sizes and capacities, you can select a Roots-Connersville Blower to deliver nearly any quantity of air for practically any industrial process.

For instance, our Rotary Positive units are widely used in separate or built-in applications where a small amount of air is required. For large volumes, you have the choice between Rotary Positive and Centrifugal Blowers, depending upon your specific requirements.

R-C *dual-ability* to supply either Rotary or Centrifugal Blowers offers important advantages to users. Because we design and build both types, we can be completely unprejudiced in our recommendations. This *dual-ability* frequently results in substantial savings in first cost and operating and maintenance expense.

Whatever your requirements may be, whether to move air or gas, ask R-C *dual-ability* for the answer. You'll be sure of the right unit to suit your needs, for long years of profitable performance.

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BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

* * ONE OF THE DRESSER INDUSTRIES * *

(*Continued from page* 210)

"In a few places along the coast today, foundries in China show the effect of contact with the methods of more highly developed countries, but owing to the still limited means of communication and transportation, only a small dent has been made in the centuries-old customs and methods. Influence from the outside has touched along the eastern coast line and slowly is penetrating the interior. It is interesting to note these older customs and methods before they become changed, as they probably will eventually. The untouched parts apparently are about in the condition of Europe several hundred years ago.

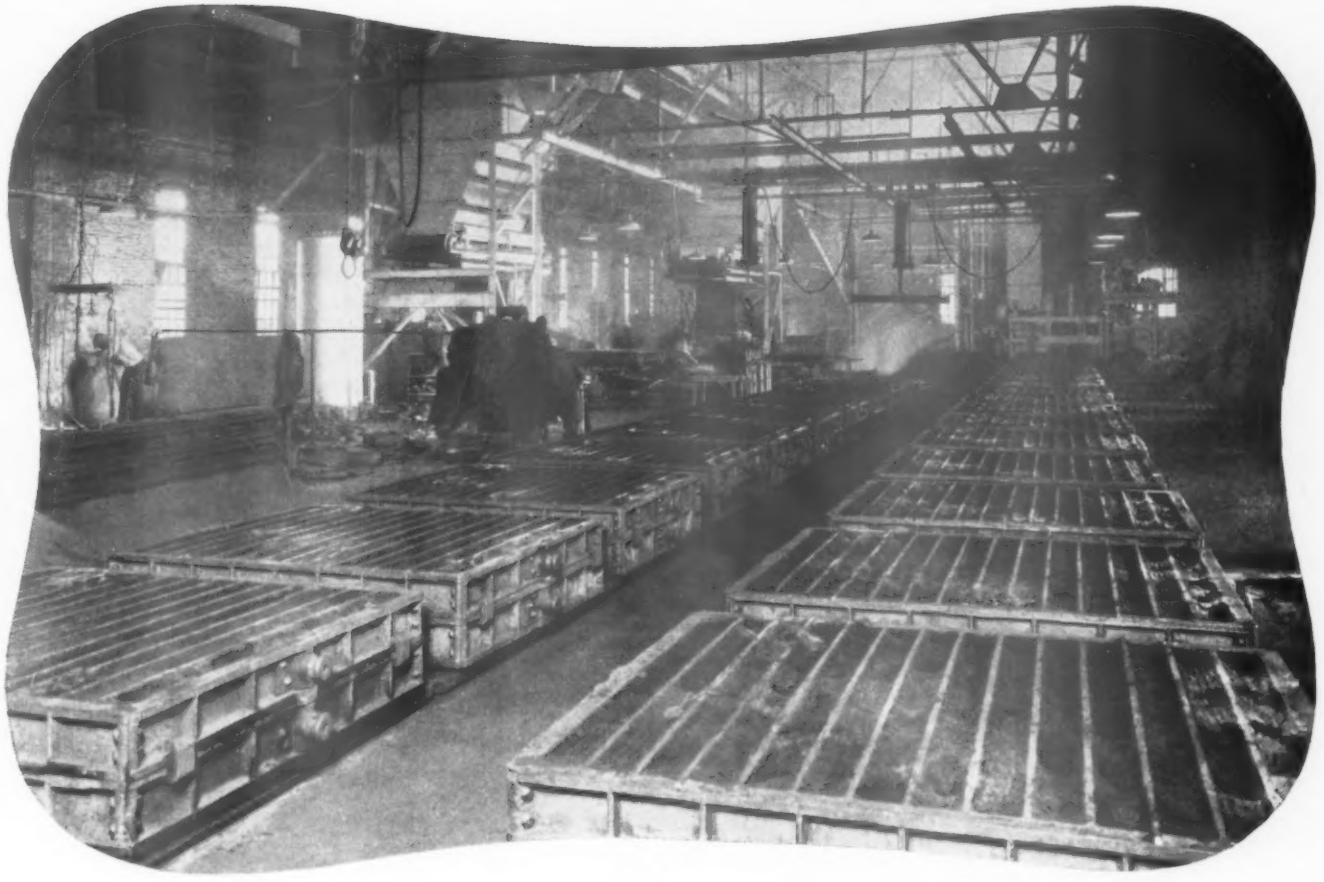
"The cupolas usually are made to tip for drawing off the molten iron. They are made in two sections. The lower section is a bowl-shaped piece lined with fire clay and mounted on trunnions. A tilting lever is inserted in a socket at the back. The upper section is a cylindrical piece lined with fire clay and luted with clay at the joint line. A single tuyere opening at one side slopes toward the bottom. The tuyere opening is directly over one of the trunnions. The tuyere pipe is just flush with the cupola shell, but does not enter. When the cupola is tipped forward for tapping, the blast automatically is shut off.

"Larger cupolas are made in three sections and are not tilted. Usually the tuyere pipe enters the back wall. The tuyere pipe is provided with a covered opening close to the cupola through which the charges may be poked, if considered necessary. Charging materials from a portable platform are tossed in the open top of the cupola. The first charge is carefully packed in the lower section before the second section is placed in position. Hooks and loops are provided on the sides for insertion of the poles employed in lifting the sections on and off. These tall, three-section cupolas seldom are seen except in the larger ports where electric power is available for operating the blower."

The most commonly used blast apparatus is the primitive feng hsiangze (pronounced fun shanzer)—try to figure that one out!—a type of wind box for a wide variety of purposes, which has been used in China from time immemorial. The range of sizes includes the tiny device made from a section of bamboo and employed by the tinker for blowing his soldering fire; a little larger size for the blacksmith fire or the kitchen stove; and the larger size used on the cupola. Construction and operation are about the same in all sizes.

In a rectangular wood box closed at the ends except for the valve openings, a fitted wood piston slides freely

(*Concluded on page* 214)



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Whether your castings are large or small, ferrous or nonferrous, Bartlett-Snow equipment will increase both the quality and quantity of your output. Individually engineered to your own particular requirements, Bartlett-Snow sand, mold and casting handling equipment turns the theoretical advantages of the newer, more fully accepted mechanized foundry practice, into practical dollar and cents advantages. Costs go down. Your product finds readier sale. The workmen get larger take home pay—easier—like their jobs better, reducing absenteeism and turnover. And the smoother, more even, more continuous production means bigger profits, larger dividends for **you.** Can we send you more details?

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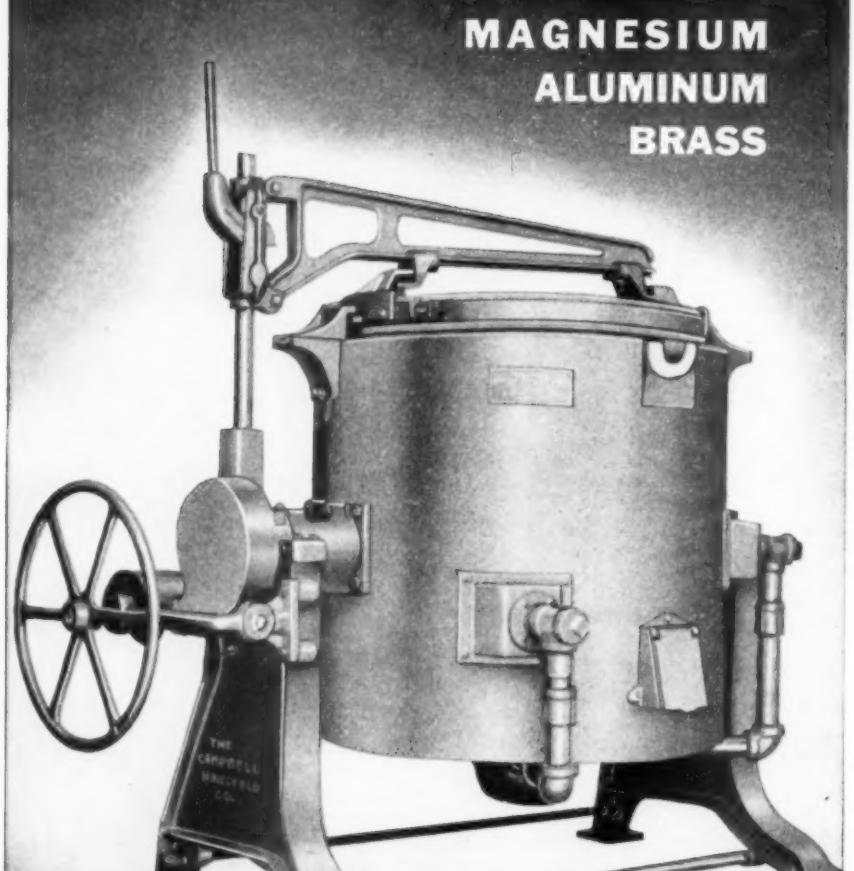
ALUMINUM
BRASS



Built for Service

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

(*Concluded from page 212*)

and is cut out to fit around the valve passages leading to the inlet and outlet valves. The grooved periphery of the piston is packed with feathers, glued in place to make an airtight connection while allowing the piston to move freely. Two bars from the piston are joined by a handle bar at the outer end. Flow of air is regulated by clapper valves hung on leather hinges at each end of the air passages. A certain volume of air is discharged through the nozzle at the center of one side near the bottom, at each forward and backward movement of the piston. Entrance to the box is provided by a dovetail slide on top.

For supplying the ordinary two part cupola, the box is about 4½ ft in length and the piston area is about 750 sq in. The stroke is so long that four men on the handle have to take steps forward and back with the movement. They give a sudden jerk at the end of each stroke to quickly close the valves. In scattered instances a crude rotary fan driven by hand through rough cast iron gears and belt is utilized. This may be regarded as an intermediate step between the primitive feng hsiangze and the electrically driven rotary blast fan in some of the larger eastern port foundries. The primitive windboxes furnish a good blast and have the advantage of being comparatively cheap to build, maintain and operate. Manual labor is pitifully cheap in China.

Materials Handling Is Movie Theme

Recently released by the Institute of Visual Training is a new movie on materials handling entitled "Payloads Pay Off." The three-reel, 26-minute black and white sound picture was produced under a grant from Automatic Transportation Co., 149 West 87th St., Chicago, manufacturer of electric industrial trucks, and was filmed with the co-operation of General Electric Co., at whose Pittsfield, Mass., works much of the action was photographed.

Instead of being advertising media for specific equipment, the new film is a dramatization of the science of materials handling itself.

"Payloads Pay Off" will be distributed through the facilities of both the Institute of Visual Training and Automatic Transportation Co. Prints are being furnished to all of Automatic's sales representatives throughout the nation, and screenings may be arranged through them, through Automatic's Chicago headquarters or through the Institute at 40 East 49th St., New York.

Film is available in 16 mm and 35 mm

(*Concluded on page 216*)

A New and Greater-

PENTON'S FOUNDRY LIST

for 1947-1948

READY IN JUNE

A valuable sales aid in your direct mail and personal contact work with the foundries of the United States and Canada. Gives information on the Gray Iron, Steel, Malleable, Brass, Bronze, Aluminum and Magnesium foundries.

Alphabetically and geographically indexed in sturdy loose leaf form with a durable ring binder and ample space for your own additional notes on each page. All information "keyed" to show at a glance the type of metal melted, whether a machine shop, pattern shop, laboratory etc. is maintained.

The name and address of each foundry is given together with the type and number of melting units, melting capacity and departmental operations.

Penton's Foundry List is recognized as the only list of foundries giving such valuable information arranged for quick, ready reference. This list is fully copyrighted and no authority is given for reproduction or sale of any of the information contained therein.

AVAILABLE ONLY FROM

ORDER YOUR COPY NOW!

BOOK DEPARTMENT

THE PENTON PUBLISHING CO.

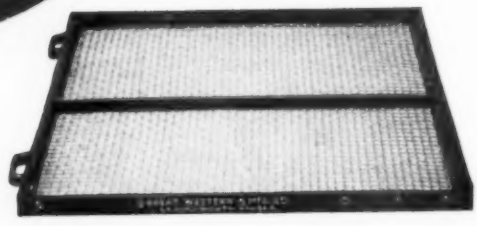
1213 W. 3rd Street **Cleveland 13, Ohio**

HOW ARE YOU FIXED FOR EXTRA SCREENS?

Combs sieve bottoms are made of very heavy galvanized wire in numerous gauges and mesh. Quantity discounts apply . . . it pays in many ways to order extra screens for your Combs units. Ask your foundry supply house or write us direct for complete price and specification pages on the Combs line.

Steel Rim and Bottom
For Your Combs
Riddle Types V and V-5.

For Your Combs
Type CS Riddle→



Order This Style
For Your Combs
CR Units.

SIEVE BOTTOMS

W & M GAUGE MESH	WIRE	LIST PRICES V	CR	CS	V-S	W & M GAUGE MESH	WIRE	LIST PRICES V	CR	CS	V-S
2	14	$1.30	$1.80	$2.25	$4.20	5	20	$1.30	$1.80	$2.25	$4.20
3	16	1.30	1.80	2.25	4.20	6	20	1.30	1.80	2.25	4.20
3-1/2	18	1.30	1.80	2.25	4.20	8	20	1.30	1.80	2.25	5.00
4	18	1.30	1.80	2.25	4.20						

Discounts 1 to 5—Net, 6 to 23—5%, 24 or more—10% (Can be mixed meshes but for same type machine.)

Steel Rims: Type V $3.60 set; Types CR-CS 5.10 set; Type V-5 14.50 set

DELIVERY NOW IN 30 DAYS ON ALL COMBS FOUNDRY RIDDLES — SEE YOUR LOCAL FOUNDRY SUPPLY HOUSE

Great Western Manufacturing Company
LEAVENWORTH, KANSAS

(*Concluded from page* 214)

sizes for showings to industrial plants and associations, civic groups, educational institutions and similar organizations.

Apprentice Training Programs Tripled

Apprenticeship programs in American industry increased by 10,756 in 1946 over 1945, according to a survey released by the Apprentice-Training Service, U. S. Department of Labor. These programs jumped to 16,574, or nearly three times the 1945 total of 5818.

In 1946 the number of establishments participating in such programs was 78,758, compared with 30,628 in 1945. These programs are conducted by local joint contractor-labor committees.

In the manufacturing and other industries there was an increase of 25,055 companies participating in programs —from 8737 in 1945 to 33,812 in 1946. A large percentage of these companies are participating in area-wide programs, while the balance have independent programs under which only the apprentices in their own plants are trained.

Fully 85 per cent of the apprentices currently employed are veterans.

Book Review

Scientific Instruments, by Herbert J. Cooper, cloth, 305 pages, 5½ x 8½ inches, published by the Chemical Publishing Co. Inc., Brooklyn 2, N. Y. Price $6.

In this day of specialization the workers in one field are not conversant with instruments used in another, and this book is written to meet that need by describing the fundamental principles and uses of various types of instruments so that a working knowledge is provided without the details of design. It is not meant to be an exhaustive treatise which tells the specialist about his own equipment, but rather it provides useful information on those used by others.

The book is divided into five sections of which the first relate to optical instruments such as lenses, cameras, microscopes, polarimeters, photometers, etc. The second on measuring instruments pertains to those for density, dimension, electricity, fluids, pressure, temperature, time, speed and weight. Section three is on navigational and surveying instruments including the barometer, barograph, altimeter, gyroscopic insuruments, mariners compass, sextant, sounding equipment and surveying instruments. Liquid testing or viscosity measurement is discussed in section four while miscellaneous instruments for acoustics, calculating machines, hardness indicators, etc., are described in section five.

Put the "Plus Factor" To Work With Sterling GRINDING WHEELS

The excellence of Sterling Grinding Wheels is built upon many "plus factors." One important one is Sterling's famous "H" Bond which has been so successfully used with toolroom wheels. Results prove that this carefully developed bond imparts something extra to each wheel—makes it do a better job longer and faster!

Another important "plus factor" is found in the predetermined grain combination that makes certain your wheel will do its specified job. Success on similar grinding jobs can be immediately translated to yours when you use the "Wheels of Industry."

Still another "plus factor" is available in Sterling's committee method of selecting grinding wheels for special purpose. Not one grinding expert, but five or six, determines the correct wheel to solve your unusual, troublesome problem. Around a table, where several ideas can be exchanged, that's where your special Sterling Grinding Wheel is developed in conference between laboratory, engineering, and manufacturing executives.

There are many more Sterling Grinding Wheel "plus factors" waiting to work for you. May we tell you more about them?

• A complete outline of the correct wheels to use on hundreds of grinding jobs is available to you in the Sterling Specification Selector. May we send your copy?

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

Industry BRIEFS

BABCOCK & Wilcox Co., Barberton, O., is improving its gray iron foundry to cost over $500,000. In the plan, $151,000 will be spent for building improvements. A new lighting and heating system will be installed, and the ventilation improved. New equipment will include a mechanical cupola charger, cleaning equipment, mold and core drying ovens, molding and coremaking machines, sand conditioning system, continuous conveyors, heat treating furnace, new cupola and dust collection system.

° ° °

Nock Fire Brick Co., 1243 E. 55th St., Cleveland, recently elected the following officers: Charles H. Nock, president, Gilbert J. Nock, vice president and secretary, and Ralph L. Nock, treasurer. Charles J. Nock has resigned as vice president of that organization and has acquired Nock & Sons Co., which now is located at 518 Engineers Building, Cleveland.

° ° °

John C. Fitzpatrick Co., Toronto 1, Ontario, has been appointed sales agent in the Province of Ontario for Ampco Metal Inc., Milwaukee. The organization will handle the sale of Ampco products except safety tools and arc welding electrodes. Anstice Co., 111 Humboldt St., Rochester 9, N. Y., has been appointed Ampco agents in western New York and will handle the sale of all Ampco products except resistance welding and arc welding electrodes.

° ° °

Western Nonferrous Foundries Inc., 2229 Casitas Ave., Los Angeles, has been formed with $500,000 capital. Directors are: E. J. Zimmerman and Leonard L. Wiley, both of Los Angeles; and Phillip M. Howell Sr., Glendale, Calif. New corporation is represented by Frederick W. Bahl, 215 West Seventh St., Los Angeles.

° ° °

Mercer Foundry & Mfg. Co., Perrysville, Ill., suffered fire loss estimated at more than $200,000, April 12. The blaze destroyed all but the lower walls of the one-story brick and stone structure which enclosed an area of 10,000 sq ft.

° ° °

Felton Aluminum Co., Felton, Calif., has been incorporated with $10,000 to engage in the fabrication of aluminum and magnesium alloy permanent mold castings. Directors are: E. T. Lincoln, Santa Cruz, Calif.; William N. Huntalas, Huntington Park, Calif., and Anthony Condos, Los Angeles.

° ° °

Erie Engine & Mfg. Co., 953 East Twelfth St., Erie, Pa., has started a $200,000 plant improvement program. A new cupola and charging equipment, sand blast equipment and a yard crane are already installed; a sandslinger will be installed, and a new sand preparation system will be added.

° ° °

National Malleable & Steel Castings Co., Cleveland, has licensed Industrial Steels Ltd., Sydney, Australia, to manufacture in Australia National Malleable's patented car couplers, freight car trucks, draft gears and other railway specialties. This is part of a $300 million program to modernize the Australian railway system. The Cleveland company's engineers also plan to design a malleable iron foundry for Industrial Steels Ltd.

° ° °

Yarrington & Johns Inc., 320 West 24th St., Baltimore, has been appointed representative to cover the states of Delaware and Maryland and the cities of York and Lancaster, Pa., for Reading Chain & Block Corp., Reading, Pa., manufacturer of materials handling equipment. New distributor will handle the company's line of cranes, electric hoists and chain hoists.

° ° °

Bellville Foundries Inc., Bellville, O., has started construction of a multiple Quonset building adjoining its foundry for use as a cleaning department. The old cleaning rooms will be utilized to provide additional molding facilities.

° ° °

United Brass Foundry, 4325 North 28th Ave., Omaha 11, Nebr., plans to move to a new location and building, which will increase its capacity for production of bronze and aluminum castings approximately 50 per cent.

° ° °

D. Thomason has obtained building permit for a 25 x 50 ft aluminum foundry building at 18102 South Broadway, East Gardena, Calif.

° ° °

Pittsburgh Foundry & Machine Co., 460 West Wilson St., Salem, O., lost its freight elevator and shaft and suffered damage to its cupola in a fire Mar. 4.

° ° °

Austin Gray Iron Foundry Co., 1727 Union Ave., Sheboygan, Wis., has obtained building permit for construction of a one-story, 30 x 60 ft foundry addition.

° ° °

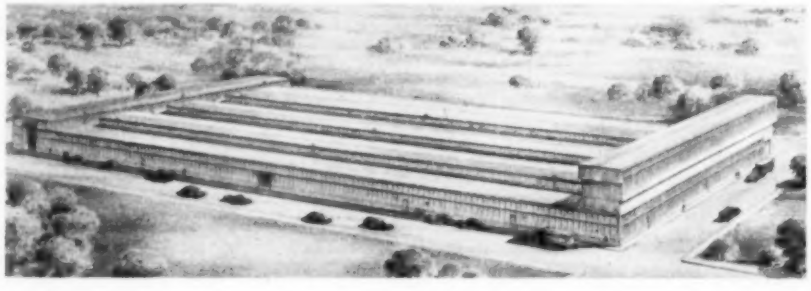
Myers Foundry Co., 1222 Burton St., S. E., Grand Rapids, Mich., is being organized by Frank Myers to manufacture small gray iron castings.

° ° °

Grew Foundry Co., 58 West Wilson St., Batavia, Ill., is now engaged in production of sand and permanent mold aluminum castings, and low pressure

(*Continued on page 220*)

To Make Grinding Wheels at New Plant



NORTON CO., Worcester, Mass., has started construction of its new Plant 7 in Greendale, Mass. Built specifically for the manufacture of vitrified grinding wheels, the plant will be 602 ft long and 320 ft wide. Adjacent to and connected with the present Plant 4, the new building will cost, complete with equipment, about $3,500,000 and is expected to be in operation by July, 1948. The completely modern plant will have up-to-date lighting, ventilation, dust collection, fire protection, locker and shower rooms. Cafeteria, hospital and offices will be completely air conditioned.

Repeat shipments are of absolutely like analysis... that's KEOKUK Electro-Silvery

FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

STEEL PLANTS

60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature meltdown. Handle by magnet. Regular or alloy analysis.

Write today for complete information.

KEOKUK ELECTRO-METALS COMPANY

KEOKUK, IOWA

Sales Agents: MILLER AND COMPANY, 332 S. MICHIGAN AVENUE, Chicago 4, Illinois

CINCINNATI 2, OHIO, 3504 CAREW TOWER • ST. LOUIS 1, MISSOURI, 407 N. EIGHTH ST.

"FALLS BRAND" ALLOYS
AMERICA'S LARGEST PRODUCERS OF ALLOYS

"FALLS" FLUX "B"
for
BRASS and BRONZE

"FALLS" Flux "B" cuts melting costs by reducing rejections and scrap caused by dirty metal.

1. It increases metal yield about 3% by putting all the metal usually lost in the dross back into the molten metal.
2. It cleans, fluxes and removes gases, oxides and non-metallic impurities from all grades of brass and bronze.

A dry white powder, "FALLS" Flux "B" does not smoke, fume or smell, will not absorb moisture, and can be handled with the bare hands without burning the skin.

WRITE FOR COMPLETE DETAILS

NIAGARA FALLS
Smelting & Refining Division
Continental-United Industries Co., Inc.
BUFFALO 17, NEW YORK

(Continued from page 218)

castings in brass and bronze alloys. Company is owned and operated by four partners, all of whom are experienced foundrymen. Wilbur F. Miner, Robert W. and Ernest L. Bartholomew and Gust A. Johnson.

° ° °

Maguire Machinery Co. Inc., 330 West 42nd St., New York, has been organized to design, manufacture and sell dairy machinery and power conveyors. Walter Maguire is president. Equipment formerly handled by the Machinery Division of Walter Maguire Co. Inc. will be taken over by this firm.

° ° °

Spring Valley Iron Works, Spring Valley, Wis., has been purchased by Helmer Severson and William Kunkel of Menomonie, Wis. Former owners, Arthur and David Kamke, are operating the foundry end of the business.

° ° °

Myer Sevesky, owner, Grant Iron & Metals Inc., Marion, Ind., recently purchased the old S & S Gray Iron Foundry, Marion. Ralph Shideler, present manager of the foundry, will remain in that capacity.

° ° °

Sales of foundry equipment in March were 573.8 per cent of the 1937-1939 monthly average, according to the Foundry Equipment Manufacturers Association. Sales were 521.9 per cent in February and 536.6 in March, 1946.

° ° °

E. G. Allen, E. E. Hook and G. R. Sager, salesmen for Dayton Oil Co., Dayton, O., and J. C. Eismann have recently acquired a substantial stock interest in the company and have been elected to the board of directors.

° ° °

W. H. Moulton, 1100 West Hillcrest, Inglewood, Calif., has obtained building permit for construction of a pattern factory at 615 Isis St., Ross District, Los Angeles.

° ° °

James B. Clow & Sons, Sixth St., Coshocton, O., manufacturers of cast iron pipe, suffered fire damage to their foundry, Apr. 4, estimated at more than $250,000.

° ° °

John C. Parker plans construction of a foundry and pattern shop building on Sycamore Ave., East Pasadena, Calif., to cost about $7500.

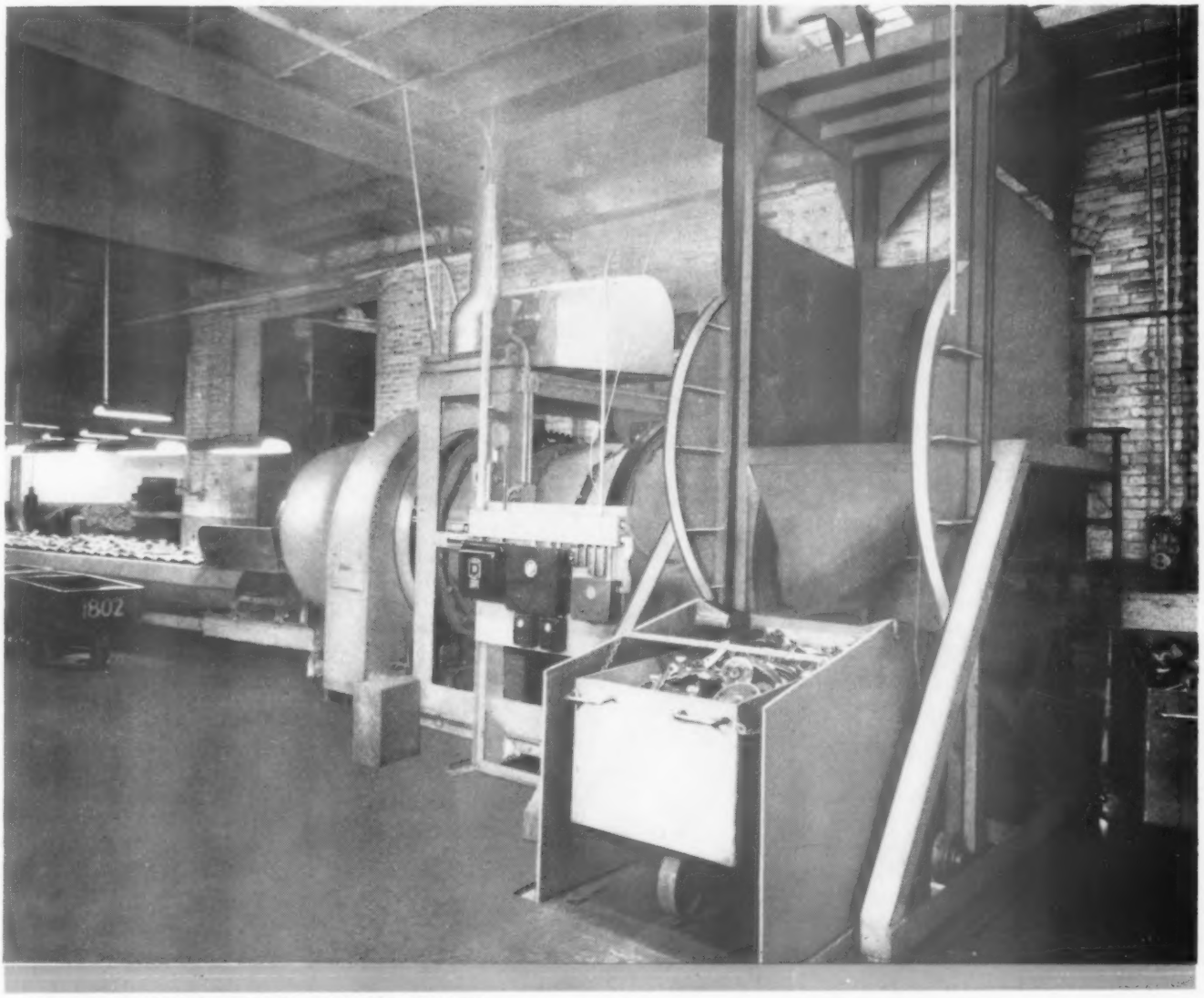
° ° °

Kirsh Foundry Inc., 125 Rowell St., Beaver Dam, Wis., has obtained state approval for a foundry addition.

° ° °

Kimberly Cast Products Inc., 2450 South Main St., Los Angeles, has been formed with $75,000 capital to engage in

(Concluded on page 222)



RANSOHOFF *AUTOMATIC STAR-RETURN* WET CLEANING MILLS

AGRICULTURAL IMPLEMENT CASTINGS are being cleaned in this 60" x 72" End-loading End-unloading wet cleaning mill. Equipped with patented discharge heads so that when rotated in one direction the tumbling medium is returned AUTOMATICALLY to the tumbling compartment. When reversed, work is discharged AUTOMATICALLY and tumbling medium is separated from the work. Work and tumbling medium CASCADE AS A MASS WHICH PREVENTS NICKING, BREAKAGE AND EXCESSIVE MILL WEAR.

SAVE 30% TO 70% ON YOUR CLEANING

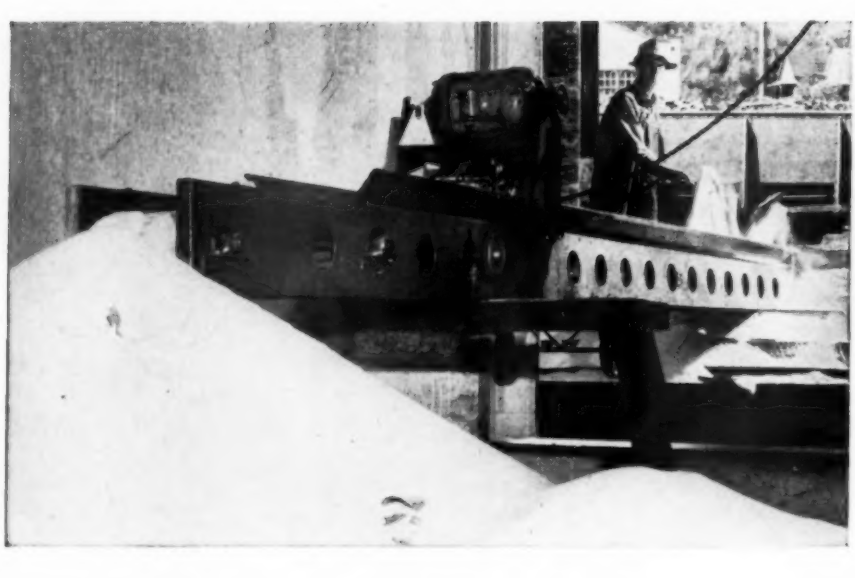
SEND US A SAMPLE BATCH We will make tests and submit complete report, without obligation on your part.

GENTLE...EASY...ECONOMICAL...NOT SELF-DESTRUCTIVE...NO DUST

MEMBER

N. RANSOHOFF, Inc.

TOWNSHIP AND BIG 4 RR **CINCINNATI 16, OHIO**



Tote-All the light conveyor that can take it!

TOTE-ALL handles foundry sand faster and with less cost.

Shown above is a Tote-All Portable Conveyor being used to unload foundry sand from a box car into a covered shed. Keeps two men busy shoveling sand into conveyor—steps up their efficiency by making the work easier for them. *(Actual tests show that a Tote-All Conveyor cut 14 hours time from hand-shoveling method during the unloading of a 75-ton car of core sand).*

Tote-All Conveyors are built for the toughest kind of usage, but are lightweight and easy to handle. Power unit, either gasoline or electric, is mounted on top of conveyor—easily accessible and out of the way of dust, dirt and spillage. Available in 14 ft. and 20 ft. lengths. With the Trail-Hoist (combination trailer and lifting device), the Tote-All can be easily moved from one job to another and delivery end of conveyor raised to desired height with hydraulic lifting device. Get full details on the standard Tote-All for all round foundry use or the new lightweight Zephyr model which may be used for handling sand or annealing coal.

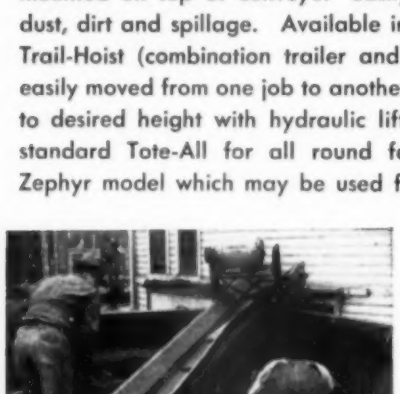


Photo at left shows Tote-All Conveyor being used to unload a car of pig iron at a west coast foundry. Tote-Alls are used for many jobs at foundries—handles bulk material up to 14 in. top size.

MATERIAL MOVEMENT INDUSTRIES,
310 S. Michigan Avenue,
Chicago 4, Ill.

WRITE FOR BULLETIN G-41

material movement industries

. . . for lowest cost material handling

(Concluded from page 220)

the melting, smelting and casting of ores and metals. Directors are Silas R. Kimberly, Pasadena, Calif.; Eugene N. Koster, Los Angeles, and Wallace D. Miller, Studio City, Calif.

• • •

De Pere Metal Works, De Pere, Wis., has been incorporated with capital stock of 60 shares at $25 per share par value to operate a general foundry business. Incorporators are Belner, Louis and Earl Beaupre.

• • •

Yattaw Foundry, Fourteenth and Fairview Sts., Anderson, Ind., was recently opened and is producing aluminum job castings. James Yattaw is proprietor and operator.

• • •

Kressbach Mfg. Co., 1325 South 43rd St., Milwaukee, has been incorporated by Edward, John and Emily Kressbach. Company makes brass castings, mainly for their own use in ornamental work.

• • •

McGann Mfg. Co., Richland Ave. & Northern Central Railroad, York, Pa., suffered fire loss, Apr. 3, estimated at $250,000 to its foundry, machine and pattern shops, offices and storage room.

• • •

Great Lakes Pattern Works Inc., 6441 Hastings Ave., Detroit, has been formed by William G. Stenback with capital of $500,000 to manufacture and sell patterns and foundry equipment.

• • •

Central Brass Mfg. Co., 2950 East 55th St., Cleveland, plans construction of a $20,000 building addition to be used for the manufacture of plumbing supplies.

• • •

National Foundry & Pattern Works, 1440 Summer St., Hammond, Ind., has added a permanent-mold section, and will produce aluminum permanent-mold castings.

• • •

Jackson Bros. Foundry, 5448 Tweedy Blvd., South Gate, Calif., plans construction of a one-story, 40 x 80 ft steel frame foundry building.

• • •

Grandview Mfg. Co., Grandview Mo., has been incorporated by Hilda, Louis and James E. Galbraith, all of Kansas City, Mo., to do general foundry work.

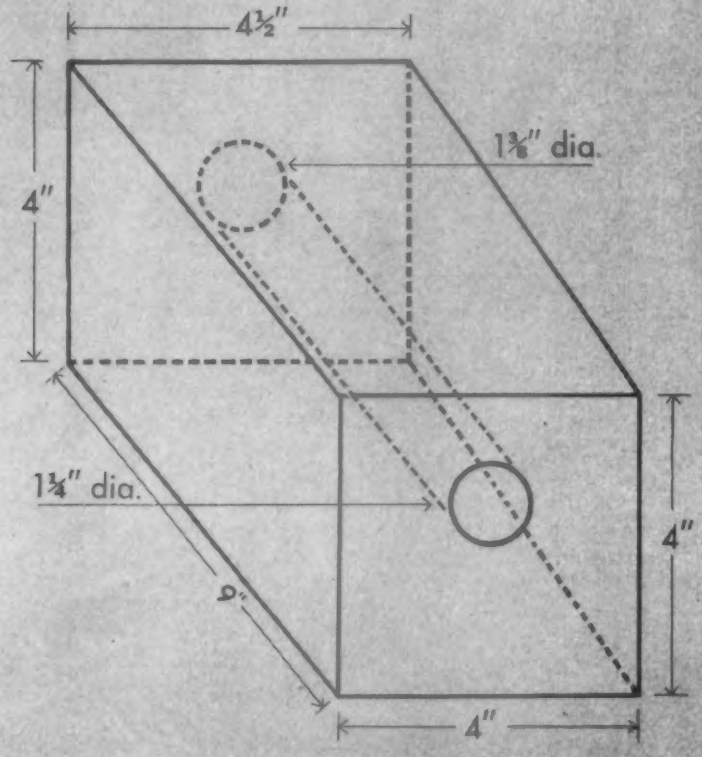
• • •

F & J Foundry, 128 North Richland St., Indianapolis, has been opened recently by J. E. Finchum and H. B. Jones and is doing gray iron job casting.

• • •

Columbian Iron Works, Chattanooga, Tenn., has stopped work on new foundry building to have cost about $275,000.

COSTLY SHUTDOWNS for Slag Hole Repairs CAN BE AVOIDED



● **Standard CARBOFRAX Slag Hole Blocks, in commonly called for dimensions shown, are available for immediate shipment. A variety of other sizes can be made to order from stock molds.**

Experience has proved that, in continuous-pour cupolas, slag hole troubles disappear when CARBOFRAX silicon carbide blocks are used.

In steady runs of 18 to 24 hours duration, their original hole size is maintained. No enlargement occurs during the blast. These hard, dense CARBOFRAX blocks are exceptionally resistant to slag erosion at high temperatures. With their low tendency to spall and crack, freedom from rapid block disintegration is provided. Expensive delays for slag hole replacement are eliminated.

Usually available from stock is the standard size of CARBOFRAX block shown in the diagram. Other sizes can be made to order. Many moulds are on hand for that purpose.

For detailed information write Department L-77, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

CARBOFRAX Slag Hole Blocks

BY **CARBORUNDUM**

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

6 Reasons WHY Every Non-Ferrous Foundry Needs the MILWAUKEE-TESSMER SPRUE CUTTER!

- Cuts Sprues and Gates of Non-Ferrous Castings with ONE SWIFT, SURE STROKE.
- Does away with slow, tedious hand labor . . . releases valuable manpower for other work.
- Results in a fast, steady flow of work through the cleaning department.
- Eliminates accumulations of unfinished work; castings are trimmed and cleaned as they come from the foundry. Less storage space needed.
- Skilled operator not needed . . . any workman can learn quickly to run the Milwaukee-Tessmer Sprue Cutter at top capacity.
- It's built for years of Rugged Service and Low-Cost, Trouble-Free operation!

MODEL "H"
with Direct Motor Drive

Milwaukee-Tessmer Sprue Cutters are built in two models which differ only in size and cutting capacity. Both are regularly powered with electric motors and have built-in speed reducers. When furnished without motors, flywheels have plain crowned surfaces for flat-belt drive.

Write for Illustrated Bulletin!

Milwaukee
CHAPLET AND MANUFACTURING CO.
1025 S. 40th STREET • MILWAUKEE 4, WIS.

A 5216-2/3

SPECIFICATIONS FOR MALLEABLE IRON CASTINGS

(*Continued from page* 84)

strength.

Fatigue Life—When the engineer uses a malleable casting to resist shock and heavy loading, he can be assured that a good casting will resist these stresses again and again many times over without failure. This is another of the properties that makes malleable so useful in railway and automotive work. It is called fatigue endurance. If a load equal to 45 per cent of the ultimate strength is applied ten million times, the metal should still be able to withstand it. Malleable is less susceptible to progressive fracture than are most cast metals. Along this same line of thought, malleable iron is also less sensitive to notch conditions than are most ferrous metals. Its notch-fatique strength is about one-third its ultimate strength.

Damping — While malleable iron will stretch and bend under load, its structure resists motion and absorbs energy within itself, thus overcoming the tendency to vibrate. The customer wants this characteristic when he designs high speed gear housing or other parts that might vibrate or hum when in use.

Shear and Torsional Strength — The yield point of malleable in shear is 23,000 psi, and the torsional yield point is about 24,000 psi. These characteristics are of value in straightening and forming castings in preparing them for use, and adapting them to withstand gear and brake loads in such castings as truck rear axle housings, etc. The shearing characteristics of malleable are also made use of when bolt and rivet holes are punched in flanges.

The engineer who wishes to use malleable iron for pipe fittings, railings or in other places exposed to the corrosion action of the elements will find it one of the better of rust resistant materials. Even under severe conditions, the disintegration of the casting is very slow.

If the customer wishes to use malleable castings at a temperature above or below our extreme atmospheric temperatures, he should do a little investigating. Below —30 F some malleable becomes brittle. This embrittlement can be overcome by heat treatment or adjusting the analysis of the metal. When castings are raised to 400 F or above, some of the physical qualities begin to decline, and the metallurgist or the foundry source should be consulted if highly stressed castings are to be used in temperatures higher than this.

(*Continued on page* 226)

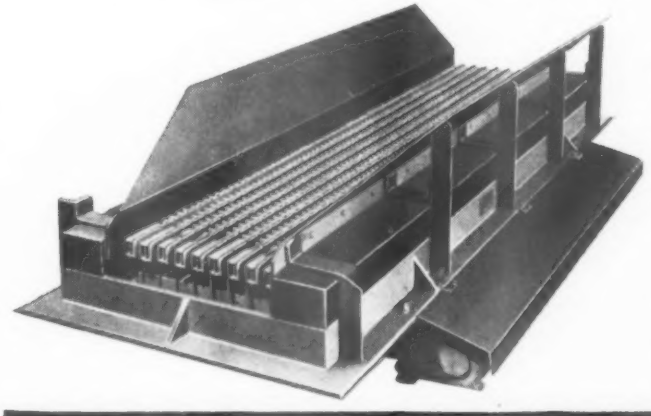
TIE YOUR FOUNDRY TOGETHER

with a portable Royer Sand Conditioner

Separate and Blend Sand Right Where It's Used

Just wheel your Royer Sand Separator and Blender to where it's needed and plug it in to any convenient electric outlet—a flip of the switch and you're producing quantities of ideally conditioned sand right where it will be used. Bama Foundries, Montgomery, Alabama, really goes for that portability feature in their Model NC-2 shown above—additions to their original shop made an easily moved sand-conditioning unit a must . . . they get production, too: 12 to 15 tons per hour. This division of the Alabama Machinery & Supply Co. handles castings from a few pounds up to a ton—two such castings are shown in the photograph. In addition to being a jobbing foundry, they manufacture sawmill rigs used throughout the South.

Portable Royers available with capacities from 4 to 25 tons per hour; stationary models from 20 to 50 tons per hour. Just shovel in sand—the Royer removes trash, breaks up lumps and clay balls, blends old and new sand, distributes moisture, increases permeability 10 to 20 points, and double aerates. Send for Bulletin 744.



The Royer Walking Beam Shakeout

Here's a shakeout that provides positive, immediate break up of sand in molds . . . yet so smooth operating that a brimful glass of water on the frame won't spill a drop . . . eliminates self-destruction, major cause of shakeout breakdown. Grids oscillate; frame is stationary. No screens to clog, no arching of sand. Write for details today.

MANUFACTURERS FOUNDRY EQUIPMENT ASSOCIATION, INC.

ROYER

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KINGSTON, PENNSYLVANIA

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The boron carbide liner — made from the strongest, hardest, most abrasive-resisting substance ever made for commercial use — accounts for the longer service life of the Pangborn-Norbide* Nozzle. 1500 hours *guaranteed* when used with metal abrasive.

Air consumption is reduced 10 to 20% as compared with iron nozzles and blasting efficiency is improved because stream contour and abrasive velocity are maintained.

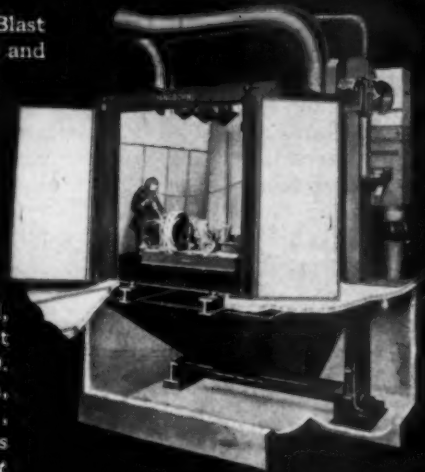
No other nozzle will out-perform a Pangborn-Norbide. Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland.

* Trademark of Norton Co. for boron carbide

FEEDS AND CLEANS ABRASIVE MECHANICALLY, HYGIENICALLY

The success of the Pangborn Blast Cleaning Room in speeding up and lowering the cost of blast cleaning is due in major part to Pangborn's development of the Mechanical System of Abrasive Recovery.

Replacing hand work, the System — by stratification and pneumatic treatment — separates good abrasive from dust, fines and coarse material, and returns it to the Blast Machine. Write for Catalog 400. Address Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland—*world's largest manufacturer of blast cleaning and dust control equipment.*



Pangborn

Pangborn Corporation Hagerstown, Maryland

BLAST CLEANS CHEAPER

WITH THE RIGHT EQUIPMENT FOR EVERY JOB

(*Continued from page* 224)

Chemical Analysis—In general, when castings are satisfactory and purchased from a reliable foundry, the customer should not be too much concerned with the chemical analysis of the metal. Usually only the physical qualities are what he desires and if the foundries can furnish these uniformly satisfactory, the customer had better leave the metallurgy to them, but the customer should demand freedom from primary graphite in heavy sections subject to considerable stress. After the annealing operation, primary graphite results in one of the poorest and weakest metals that can be found.

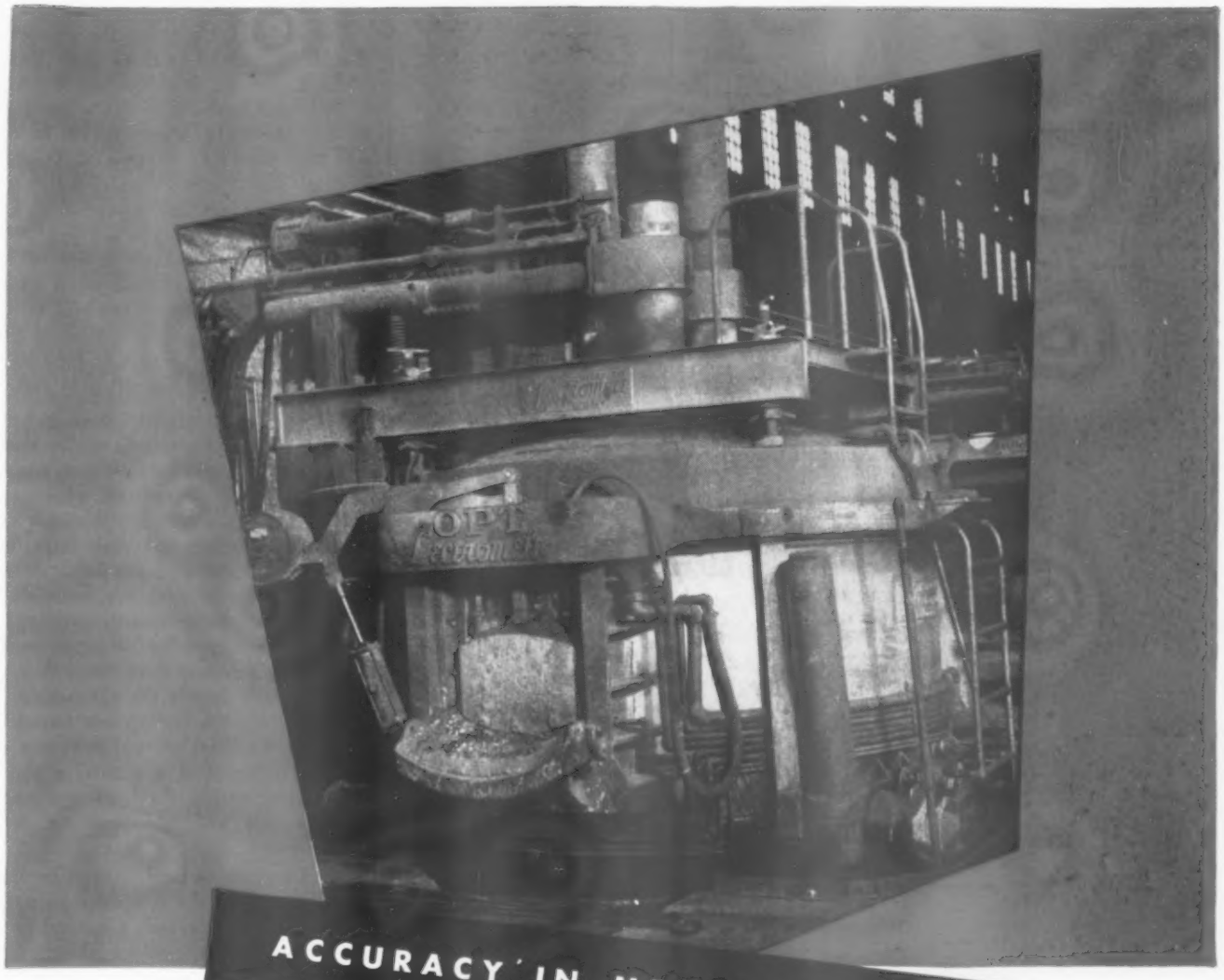
Condition of Castings — Now let us consider what the customer can demand with regard to the condition of the castings as he receives them. In this regard, he can be expected to show immediate interest because much may depend on the appearance of the casting. Under the head of appearance, we can consider cleanness, finish, accuracy as to size and form, and freedom from external casting defects such as shrinks, blows, porosity, cracks, swells, misruns, etc.

Shrinks — The customer can demand castings free from shrinks in any critical areas, and the foundry should break castings until they can show that these areas are uniformly solid. To accomplish this, it is often necessary for the customer to co-operate with the foundry in making a design that when properly gated, can be cast without shrinks. The customer must also be willing to include in the price of the castings an amount large enough to cover the investigation. This also applies to all other defects that may arise from the peculiar design of the part.

Cleanness—This is a matter that often leads to misunderstanding. A casting clean enough for some purposes might be entirely unsatisfactory for the inside of a hydraulic pump, where the least particle of sand or metal might cause damage.

If the customer has any special requirements along this line, they should be presented with the inquiry for the casting so that both parties may be fully informed on the subject. Some customers wish their castings shot or sand blasted, while others prefer them tumbled because of the smooth glossy finish they receive in the barrels. Tumbling peens over small surface defects which blasting might open up. An understanding on this subject should be arrived at when the casting order is placed and accepted. At any rate, unless otherwise specified, a customer can expect to receive his casting free from sand, scale, scabs, fins and protruding gates.

(*Continued on page* 228)



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DETROIT ELECTRIC FURNACE DIVISION

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DETROIT ELECTRIC FURNACE DIV.
KUHLMAN ELECTRIC CO., BAY CITY, MICHIGAN

3

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(*Continued from page* 226)

Cracks—On this point the customer should be careful. Cracks may occur while the metal is solidifying, because of improper handling of the white iron, in the annealing operation, or in the soft iron cleaning. In general, cracked castings should not be used, but some fine surface cracks may appear which are so fine that the casting is not weakened because of them and which are so located that the stresses will never cause them to grow into larger cracks. A customer should not be too critical of this kind of crack, which usually requires a powerful magnaflux inspection to find.

Other Defects—After the castings have been ground and cleaned, swells, small blows or other small holes may appear in the surface. These are, of course, defects which the customer does not desire, but knowing that such imperfections are an almost unavoidable occurrance with the use of the materials a foundryman must necessarily employ, he should be co-operative in occasionally overlooking a few of them when they do not materially impair the appearance or use for which the casting was intended. When such defects are too numerous or become recurrent at a particular place, the foundry should check its equipment and methods and take steps to overcome them.

Hard castings or hard spots in castings must be watched for diligently, as nothing seems to create such a general furor in the customer's machine shop as to have a set of tools wrecked by a hard iron casting. Every department in the shop hears about it. A customer can demand and expect that the hard iron calamity will not happen to him.

Welding—It sometimes happens that a casting defect or crack might be repaired by welding. What should be the customers attitude regarding such salvage?

Many users and many malleable foundries will not permit of welded castings. In doing this they are keeping on the safe side. In a large number of cases the overall cost of welding would be more than the salvage value of the casting. But when the defects are small surface openings and well away from highly stressed areas, and the value of the casting is considerable, some method of repair should be permissible. Fusion welding is not desirable if there is any danger of the heat approaching a highly stressed section and causing the metal to become brittle. After a fusion weld has been made, the casting should be annealed to soften the material and relieve the stresses. Small holes can be plugged with brazing or silver solder when such work will not impair the

(*Continued on page* 229)

utility or machinability of the casting.

Straightening — We have now produced a casting with the desired metal, to the desired form and with the desired finish, but does it meet the customers requirements? Will it fit his machining fixtures or assemble with other parts? In other words, has it warped or become distorted in annealing or handling? If this is the case, it must be straightened in order to meet the customer's requirement. This operation is usually easier to perform than to remove the cause of the distortion. Straightening may be done by hand if the quantities are small and the casting light, or under a drop hammer using some form of die, or with regular dies in a hydraulic press, where the piece is held momentarily under high pressure while the metal adjusts itself to the desired form. If this operation has been properly handled, the casting should come from the foundry shaped to fit into the fixtures or where desired. The customer must not expect that such an operation will make machining work unnecessary where accurate fits are required.

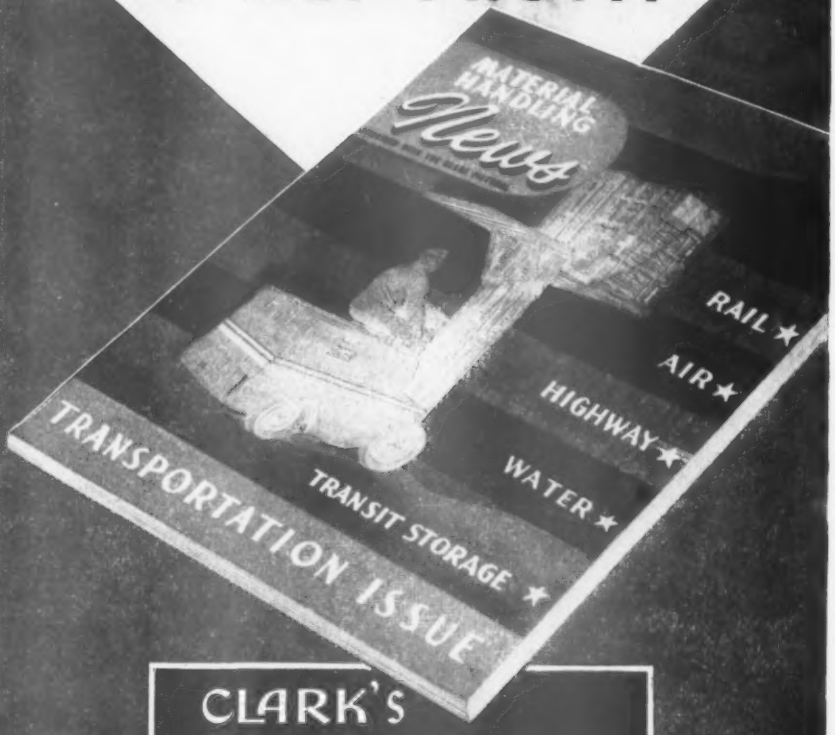
Coining Usually Satisfactory

Following the same type of operation, let us consider the coining of malleable castings. This may be performed either in the foundry or by the user.

Malleable castings of suitable analysis and properly annealed and of suitable form and section can be placed in a coining press and have some surfaces flattened or smoothed and reduced to certain controlled dimensions. This operation may be satisfactory for some bosses and simple sections, but the limit of accuracy of the final dimension will depend on the accuracy and hardness of the casting. The physical effect of coining is to harden the metal, increase its tensile strength and reduce its elongation. On castings where coining is practical, it is a quick and inexpensive method of smoothing and dimensioning two opposite surfaces. Unless one is sure by past experience that coining will give the results desired on any particular part, it would be well to try out a number of samples before making the final decision.

If the customer is dealing with a reliable foundry, he should expect co-operation in the design of the part. The designer should feel free to show the foundryman his plans and ask him what difficulties he may foresee in making the castings. And the foundryman should not hesitate to make suggestions from his own experience that might result in better castings and a more satisfied customer. I have heard foundrymen say, "We can make castings from any pattern that we can draw from the

IF YOUR TARGET IS NET PROFIT



CLARK'S MODERN METHODS AND MACHINES AS PRESENTED IN THIS NEW ISSUE OF "MATERIAL HANDLING NEWS" WILL HELP YOU TO ACHIEVE YOUR AIM

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Division of CLARK EQUIPMENT COMPANY
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Dept. B

Please send me a copy of the Transportation Issue of "Material Handling News."

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sand and it isn't our business to tell our customers what they should do." They would then use many chills and risers and extra gating to get results that might have been obtained much more simply and economically by changes that would have been just as satisfactory to the customer.

This same co-operation should continue when samples are submmitted, to make sure the user is getting the full quality he desires and the foundry is taking advantage of the best methods of furnishing it.

It sometimes happens that the customer will ask for a delivery schedule that is much slower than is advantageous for the foundry to produce the castings. Such a schedule may require periodic pattern and flask changes that add more to the cost of the castings than would be the cost of receiving them at one time and storing them. The economics of such schedules should be taken into consideration and worked out to the best advantage of both parties.

In conclution, I want to quote Carl Joseph, of the Saginaw Malleable Iron Plant, who says, "Some purchasers have inaugurated an idea that is worthy of further thought by other casting buyers. In purchasing their castings, the following notice is enclosed with the blueprints and purchase order:

'We depend on your experience as foundry men to guide us in all problems of foundry practice, and therefore request that you make a thorough study of this casting before proceeding with construction of pattern equipment.

'If you have any suggestions for changes in design, which, in your opinion, will facilitate the foundry problems and will result in better castings, they will be given every consideration in the light of functional design. If no suggestions are made, we must consider it as your acceptance of the design.

'We are attaching extra drawing, and we ask that same be marked up showing parting line, gating, etc., and returned promptly. Our tool design will then establish locating points for first and second operations, and these locating points will be incorporated on the drawing and copy showing same will be sent to you.

'You co-operation and promptness in following this procedure will be appreciated.'

"Co-operation of this kind is what the foundry industry welcomes. It creates a better understanding of all problems involved in the production of satisfactory castings. As our industry moves further into the peacetime era, production of cheaper and better castings will become paramount in the minds of all progressive foundrymen."

THE MOST PROFITABLE REFRACTORY DATA YOU'LL EVER READ . . .

Here's the book that tells all about Buckeye Silica Firestone—gives comparative data and figures on its lower cost and greater efficiency. Foundrymen will be interested in the many pages devoted to results obtained from Buckeye in cupolas, ladles, etc. Interesting, too, are the testimonials from well known foundry executives. Send for your copy . . . it will be mailed immediately.

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"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

To Discuss Corrosion And Protection

Technical papers to be presented at the University Conference on Corrosion and Metal Protection will be of a quantitative and research character, emphasizing the science background of corrosion rather than the art of corrosion testing and practice according to Chairman Hugh J. McDonald, Illinois Institute of Technology, and Vice-chairman Mars G. Fontana, Ohio State University. Meeting will be held at the Museum of Science and Industry, Chicago, for 3 days, June 11 to 13.

Speakers and their subjects follow: Carl W. Borgmann, University of Colorado, "Bi-metallic Corrosion;" Mars G. Fontana, Ohio State University, "Surface Studies of Metals from the Corrosion Standpoint;" A. L. Ferguson, University of Michigan, "Mechanism of Overvoltage Phenomena;" Norman Hackerman, University of Texas, "Role of Absorption from Solution in Inhibitor Action," and Cecil V. King, New York University, "Kinetics of Dissolution of Metals."

over 40% saved on binder

with cores equal in every respect

That's the almost unbelievable story in one foundry, a story of substantial savings that might be duplicated right in *your own* foundry through Swan-Finch service.

Of course your own conditions are different . . . but that's no obstacle to the Swan-Finch engineer. He's *trained* to solve different problems. He has a thorough knowledge of most foundry conditions, practices, and binder properties. And backing him is 90 years of Swan-Finch experience.

So, if *you* want binder savings, too, just call in the Swan-Finch engineer. The coupon below will bring him. At no cost, no obligation — *with no interruption in production*—he will recommend a binder tailored-to-order for your requirements. One that will do a better job at less cost.

SWAN-FINCH CASE HISTORY No. 246
Product: Brass Valves
Mixing Equipment: Muller
Core Mix: 72 qts. Michigan City Lake Sand, 24 qts. Berlin Sand, 24 qts. Molding Sand, 6 pts. RD3-159 Core Oil, 1½ pts. Kerosene, Water to temper.
Core Oven: Oil Fired
SAVINGS IN BINDER (with cores equal in every respect) ... When SAFCO RD3-159 replaced linseed oil . . . over 40%.
EXTRA BENEFITS: No change needed in oil-sand ratio.

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YOUNG MAN AND THE FOUNDRY INDUSTRY

(*Concluded from page* 98)

more interesting things to study and to do. Also, you will probably find less competition from other technical men than in most other lines of endeavor.

When you go to work in a foundry, please don't make the mistake of being "high hat" with your fellow foundry employees. You will find they are a pretty fine bunch of men from whom you can learn a lot. The old time molder was not only a good mechanic, but an artist as well. Remember that you have had a better opportunity to get a good education than most of the men you will meet

Wear the same kind of clothes as the rest of the gang when you go to work in a foundry, and put your fraternity pin away in the dresser drawer, or wear it on your undershirt.

Spend a good deal of time in the pattern shop. This is a good place to learn something about molding. The pattern shop is now the foundry planning department, and you can take your hat off to a good patternmaker. He has to know more about a drawing than the man who made it, and on top of that he has to know how the job will be molded, cored up and machined.

The smart aleck who made the remark years ago that all the foundryman needs is a strong back and a weak brain, was a malicious liar and probably never saw the inside of a foundry. Foundries today especially need brains rather than brawn.

Step Up Production • Cut Operating Costs
with the NEW, IMPROVED
"CAST-MASTER"
Die Casting Machine

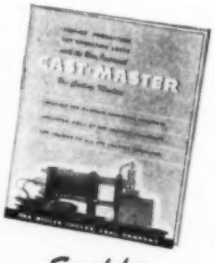
Precision Built by

DIE-CASTING ENGINEERS...
for Zinc, Tin, Lead, Magnesium or Brass

● A die-casting machine that has withstood the rigid test of American industry. Designed and built by die-casting engineers and under constant observation of experts for years. As a result the present models embody the very newest in engineering development and offer unparalleled performance at a new low in operating cost.

New feature eliminates necessity of opening of die to a maximum to eject casting

Now with the new Cast-Master there's no need to open the die to 12 to 14 inches when 5 inches is sufficient to eject the casting. With the loosening of two jam nuts the stroke can be adjusted to the space necessary to make the ejection. A feature that steps up production immeasurably and saves time and labor.



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5005 EUCLID AVENUE • CLEVELAND 3, OHIO

BUILDS MODERN GRAY IRON FOUNDRY IN KANSAS

(*Continued from page* 93)

the sand to all consuming areas. The muller has 10-cu-ft batch capacity and has auxiliary equipment for air cooling and fines removal. Control of preparation, quantity, quality and distribution is centered in a sand laboratory equipped with the necessary apparatus for conducting tests on grain size, permeability, green and dry bond strength, moisture content and behavior when exposed to high temperature.

Mixing cycle of the muller is set up for 25 batches per hour. At the shakeout station the sand falls through a vibrating screen which removes core butts and other nonmagnetic foreign material. Stray pieces of iron or steel, wedges, gaggers, scrap, etc., are caught and removed by a magnetic pulley at one end of the sand conveyor belt. Sand is segregated in four large storage tanks by an interlocking elevator and spout system.

The main bay of the foundry is served by two overhead electric traveling cranes. The remaining bays and the core room are served by an interlocking monorail system with suitable switches for diverting a load to any given point. Molten metal is distributed all over the shop by this system, with the exception of the main bay where the large ladles are handled by the traveling cranes.

Cores are dried in two gas-fired automatically controlled ovens with pyrometer attachment, and with a system for recirculation of hot air and efficient removal of moisture in the early stages of baking. Two cars carry the large cores into and out of one oven. Smaller cores are dried in a drawer type oven.

Iron is melted at the rate of approximately 7 tons per hour in a cupola lined to 42 in. diam. Weight of each iron charge is 1000 lb with 125 lb coke and 40 lb limestone. Blast volume of 3000 cfm is supplied at a pressure of 12 oz

(*Concluded on page* 234)

IRONTON BERLITE

May We Send You Our New Bulletin on "IRONTON BERLITE"

"Ironton Berlite" is the most successful ladle lining material available at this time. Its very high refractoriness, freedom from shrinkage and super resistance to slagging, enables it to last much longer than ordinary ladle mixes. Every foundryman who uses "Ironton Berlite" is enthusiastic about its performance and will recommend it to his friends.

"Ironton Berlite" is a dry, pulverized material. Just mix it with water to the desired consistency and it can be used for either tamped or mud linings in iron foundry ladles. It is also used as a mortar for laying brick in brick lined ladles, and for laying up cupola blocks in the well and melting zone.

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO

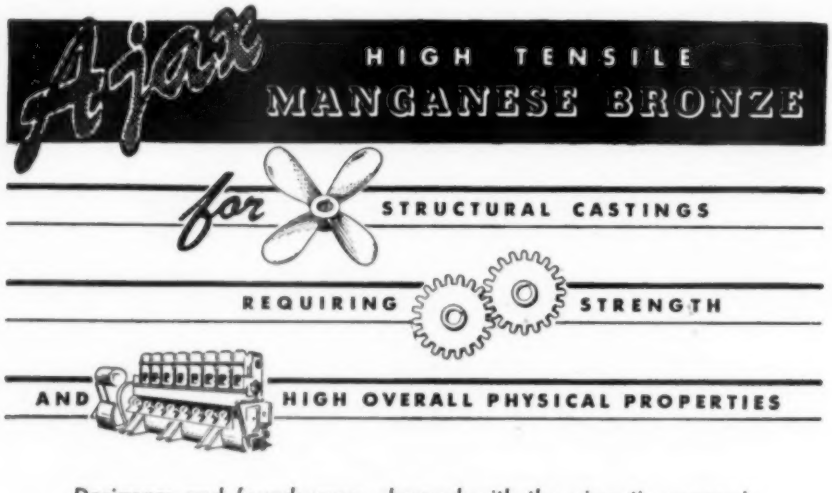
(*Concluded from page 232*)

and is automatically controlled to meet fluctuating atmospheric conditions. Temperature of iron at the spout is 2800 F or higher and is pyrometer checked at each tap. A wedge test also is made of each tap and a fracture test is made at the receiving ladle before each ladle is filled and taken to the pouring station. Inoculating agents are added while the stream of iron is flowing through the spout. Steel scrap in the cupola charge varies from 10 to 40 per cent, with resulting physical properties in the iron of tensile strength ranging from 35,000 to 50,000 psi, and hardness from 195 to 220 bhn. Alloy Ni-hard iron with tensile strength of 45,000 psi forms a considerable part of the total tonnage. A second cupola, 33 in. diam inside the lining, erected close to the first at one end of the building is kept in readiness and is employed occasionally for running small heats.

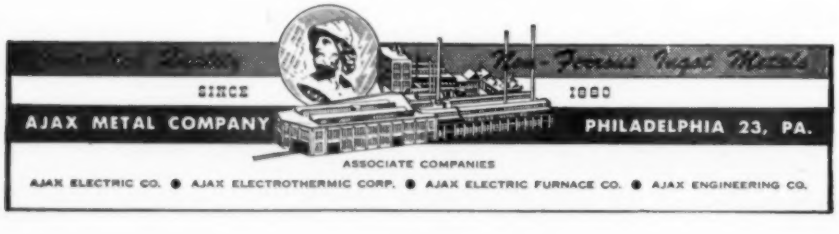
In the 75 x 280-ft stockyard outside the cupola department, which is 48 ft high, pig iron and scrap are unloaded by crane and magnet and stored in overhead bins. A bucket mounted on a scale car is spotted under the bins and loaded with definite amounts of the various component parts of the charge according to a sheet issued by the chemist in charge of cupola operation. With two buckets in use, one bucket is loaded while the other bucket is in transit. The loaded bucket is lifted by an electric hoist, and transferred to a trolley which inserts the bucket in the cupola. Here the latch on the bottom of the bucket is tripped by contact with a bumper and the contents fall on top of the column of material in the cupola.

Metal from the cupola is tapped into a cylindrical, covered, insulated receiving ladle which also serves as a mixer. Sufficient clearance exists between floor and receiving ladle to permit entrance of the bull ladles employed in carrying iron to the various pouring stations in two bays. A portable cover is removed from a pit in the floor in front of the receiving ladle to accommodate the large crane ladle which carries the metal into the bay where the larger castings are made.

Advisory technical service to casting buyers in the western country is available through the metallurgical department. This metallurgical engineering service, recently added to McNally Pittsburg Foundries Inc., enables manufacturers to get the service of a metallurgical engineer for study of machining and service requirements in their shops.



Designers and foundrymen, charged with the gigantic responsibility of specifying engineering materials for the products of a world once again at peace, are closely scrutinizing the widest range of selectable materials ever offered to industry. Of primary importance is the direct consideration of Performance; and, decisions thus made must, of necessity today, be tempered with new emphasis on total Cost. An alloy, therefore, which measures high in strength, toughness and corrosion resistance—which has cut its eye-teeth long ago on marine castings and fittings, engine bases, pump bodies, gears, etc.—yet permits the foundryman to produce solid castings perfectly free from surface imperfections and which leave the sand bright and clean—and will take a mirror-like polish—an alloy like that deserves investigation. A metal of such calibre is Ajax High Tensile Manganese Bronze. Produced under rigid laboratory standards to constant formulae, this Ajax ingot has established recognition as the highest quality manganese bronze available. Write for complete data NOW.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Work Rest Periods Boost Production

Scientific use of rest periods to increase production per man-hour is growing in industry, according to a survey just completed by the Labor Relations Institute, 1776 Broadway, New York 19. Actual departmental production has been stepped up by as much as 10 per cent through adoption of these planned rest periods. Furthermore, a report of the findings discloses that employees who are given no official rest period tend to take unofficial ones of their own with a consequent lowering of morale, discipline and efficiency.

Certain types of operations are more vulnerable to employee fatigue than others, the institute points out. These include any highly repetitive assembly or machine shop job; work involving extreme precision; very fine detailed work calling for sharp eyesight and a deft manual technique; and monotonous clerical duties.

Certain types of employees also are more subject to fatigue than others. The more susceptible includes the elderly worker; the young, inexperienced worker; women employees in general, and workers who have switched to factory or exacting office jobs from less arduous or detailed work.

Why Metal Penetrates Cores and Molds

(*Continued from page* 81)

and properties of each series of sand mixes used and the cores prepared therefrom.

Series I—An inspection of the cavities of the casting poured using this series of cores revealed excessive penetration of metal, as evidenced by protruding metal fins in the case of the 1-30 mix, down to very slight metallic protrusions in the cavity of the casting containing the core prepared from the 1-100 soy bean oil to silica sand mix. It therefore became apparent that the amount of oil present in the core sand mix had a direct bearing in an inverse ratio on the ability of the core to withstand the penetration of molten metal, and thus eliminated the theory that a stronger core was a better core for this purpose.

Series II—This casting cavity showed no finning or metal penetration. However, there was evidence of slight gas impressions.

Series III—An inspection of the casting cavities revealed that the metal had penetrated the cores in all cases to a greater extent than heretofore experienced. Although the metal seemed to have penetrated the cores made from the richer wheat flour mixes to a greater extent, all castings poured in this series evidenced a greater tendency of the metal to penetrate this type of core.

Series IV—The casting cavities surrounding these cores indicated very slight metal penetration with evidence of gas impressions becoming more abundant with increase in pitch content.

Series V—Inspection of the cavities surrounding these cores showed smooth surfaces with no evidence whatsoever of any metal penetration or other inability of the metal to lay well against the core.

Series VI—Inspection of the casting cavities showed very slight evidence of metal penetration together with a few gas impressions with the richer wheat flour mixes, and neither metal penetration nor gas impressions with the leaner mixtures.

Series VII—None of these castings showed evidence of metal penetration. However, there was evidence of bad gas impressions in the casting cavity, this condition becoming more pronounced as the pitch content of the mixture increased.

With the Series II core as an indication it was decided to determine the effect of permeability as a factor in the ability of a core to withstand metal penetration. The first step toward this accomplishment was the reduction of Lake Michigan sand by grinding to the *same permeability* as No. 50 silica sand. A 1-50 mix of raw soy bean oil to sand with sufficient water added gave a moisture of 3.1 per cent, a permeability of 73, and a green bond compression strength of 130 psi in the case of the Lake Michigan sand mixture, and a moisture of 2.6 per cent, a permeability of 73, and a green bond compression strength of less than 50 psi for the No. 50 silica sand mixture. After baking, the Lake Michigan sand cores exhibited a dry permeability of 77 and a tensile strength of 59 psi, while the No. 50 silica sand cores had a dry permeability of 85 and a tensile strength of 130 psi.

Inspection of the casting cavities showed no penetration or gas impressions from the Lake Michigan sand core, while the casting surface surrounding the No. 50 silica sand core was badly finned, indicating severe metal penetration with no evidence of a gaseous condition.

The second step was to open the permeability of No. 50 silica sand by the

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addition of a coarser No. 3 silica sand to the *same permeability* as Lake Michigan sand. The 1-50 mixes of raw soy bean oil with these sands gave moistures of 2.6 per cent, green permeabilities of 151, and green bond compression strengths so small as to not register on the testing machine. After baking, the silica sand core exhibited a dry permeabiltiy of 178 and a tensile strength of 155.5 psi, while the Lake Michigan sand core had a dry permeability of 185 and a tensile strength of 135.5 psi.

As before, the silica sand core produced a casting cavity that was badly finned with no gas impressions, while the Lake Michigan sand core allowed neither metal penetration nor gas impressions.

From the foregoing series of tests, it has become increasingly evident that a sand core is more susceptible to metal penetration with increasing proportions of binder and that the character of the sand itself has a pronounced effect on the ability of the core to satisfactorily perform its function. It is further apparent that some reaction in the core was causing it to crack open along certain cleavage planes, as evidenced by the long metallic fins projecting from the casting cavities.

Samples of burned core sand that had been removed from the cored cavities were examined under a 100-power microscope in order to determine why lower fusion point sands such as Lake Michigan and Bridgeport sands were better able to withstand metal penetration than a high fusion point pure silica sand. As the samples of burned sand were examined, it was noticed that whereas there were some dark particles in the Lake Michigan and Bridgeport sands, there were many more such particles in the silica sand. These particles were examined minutely and found to be small globules of carbonaceous material.

Develop Theory on Penetration

With this evidence it became possible to describe exactly why certain of the cores in the previously outlined tests had opened and admitted the liquid metal. As the hot metal entered the mold the organic constituents of the core, namely, the baked oil, pitch or wheat flour binders, were decomposed by the excessive heat and passed off through the core vents as gases by combining with oxygen from the air in the mold and in the voids between the sand grains in the core itself. However, as the mold became completely filled with the molten metal and all available oxygen was completely absorbed, the hydrocarbons in the binder at the extreme surface of the core became gaseous because of the high temperature, and sought to pass out through the minute passage ways between the sand grains in the core. As these hot hydrocarbon gases escaped from the core surface they deposited carbon in the small passage ways between the sand grains and built up into solid carbonaceous globules that created pressure between the sand grains where they were retained.

The deposition was augmented by other carbon formation resulting from the decomposition of the binder in the non-oxidizing atmosphere in the zone slightly more distant from the core or mold surface. The pressure exerted by the carbonaceous particles and the thermal expansion of the sand grains, together with other contributing factors, succeeded in prying apart the now well-weakened core in definite cleavage planes into which the molten metal forced its way.

With the problem solved as to how the metal penetrated the core, the next step was to find the cure. Therefore, it was decided to add finely ground iron oxide (or rouge) to the silica sand mix in an effort to supply enough oxygen at high temperatures in the cores itself so that the gaseous hydrocarbons would form oxides

(*Concluded on page* 238)

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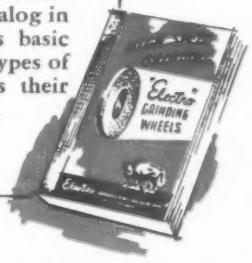

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(*Concluded from page* 236)

of carbon and other products that would remain gaseous at room temperature and, therefore, pass out of the core instead of forming solid carbonaceous particles.

Three more mixes were prepared using a 1-40 mixture of soy bean oil to No. 50 silica sand, containing ½, 1 and 2 per cent iron oxide (Fe_2O_3), respectively. The green properties of the mixes were moisture 2.7 to 2.5 per cent, permeabilities 77 to 75, and green bond strengths too slight to register on the testing equipment. The dry permeabilities ranged from 93 to 88 and the tensile strengths averaged from 163 to 173 psi. An examination of the casting cavities showed that there was slight metal penetration with the ½ per cent iron oxide core, but that there was *no metal penetration whatsoever* with the 1 and 2 per cent iron oxide cores, conclusively proving that the addition of iron oxide as a supplier of oxygen at high temperatures prevented the deposition of carbonaceous material that caused the core to break open and admit the molten metal. It is further noted that the addition of iron oxide tends to produce a stronger core with the same addition of oil binder.

With the knowledge gained from this investigation (which was conducted several years ago) a great many steel and iron foundries are now using iron oxide in their core sand mixtures and mold sand facings as a means of preventing metal penetration.

Research toward the control of gaseous reactions at high temperatures in metals as well as in mold materials may well point the way to improved foundry practices.

The opinions expressed here are those of the author and do not imply War Department endorsement of factual accuracy or opinion.

Editor's Note: The author, Maj. Donald M. Bachelor, has been special assistant to the chief of the branch of the U. S. Army Ordnance Department responsible for the engineering of ammunition and bombs. Among other duties he has served as consultant on castings and foundry practices. During the latter part of World War II, he was delegated to China on a production and economic mission. Prior to this assignment he was in charge of the production engineering of artillery ammunition projectiles in the Industrial Division of the Office, Chief of Ordnance, Washington. Before the emergency he was associated with General Railway Signal Co., Rochester, N. Y., and Campbell, Wyant & Cannon Foundry, Co., Muskegon, Mich. Major Bachelor holds a bachelor of science degree in engineering from the University of Michigan, is a graduate of the Industrial College of the Armed Forces, and is the author of commodity studies of Molybdenum.

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SHOULD MOLDS BE VENTED?

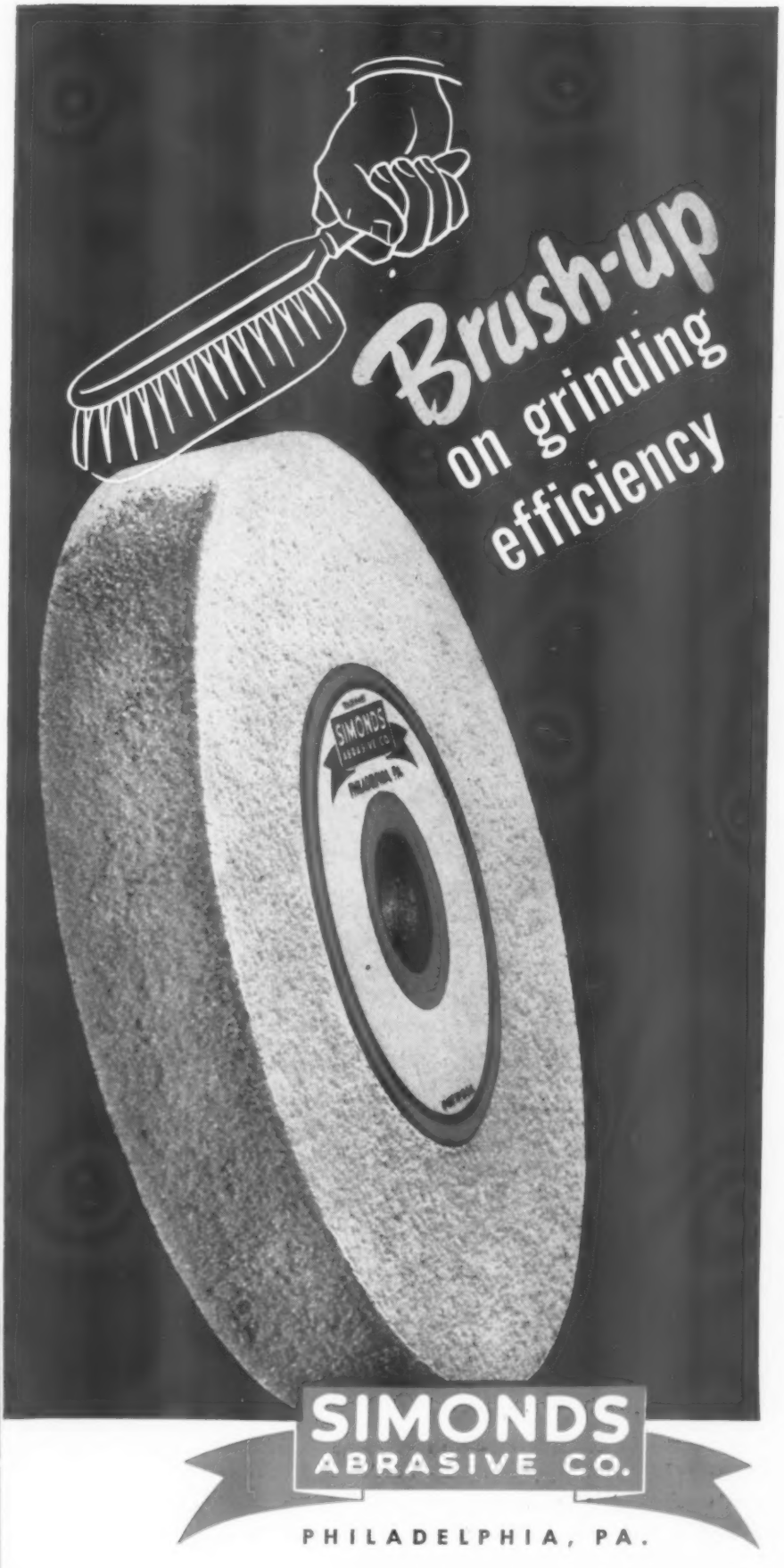
(*Continued from page* 87)

made from them were baked or thoroughly dried before pouring, but subsequently it was considered possible to pour the molds without baking or drying. Initially this practice was not wholly successful but later developments resulted in the so-called "green sand practice" now employed in making most small steel castings.

Mold venting apparently started when fire clays and sands of low permeability were used. However, the practice could have been eliminated when bentonite-type clays replaced the fire clays, because the former increase sand permeability through their expansion when mixed with sand and water. Introduction of bentonite clays marked the immediate growth in green sand casting of steel.

Many steel foundrymen maintain that molds must be vented up through the cope to let out the air. Further, that unless the pressure—presumably built up and progressively developed in the mold while pouring—is relieved, it will become so great as to arrest the inflow of metal at some points before the entire mold cavity is filled, causing premature solidification. Such foundrymen also profess inability to run light-sec-

(*Continued on page* 240)



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(*Continued from page* 238)

tioned castings or to fill out other castings sharply in the higher points unless vents are taken up through the cope.

As a matter of fact, light-sectioned castings weighing a little more than 1 oz, with as many as 20 castings on a gate, are being cast successfully without venting. Other castings with 3/16-in. sections and extremely large surface areas, made on jolt-squeeze machines in slip flasks, are regularly cast with no increase in misruns.

Molds poured with metal sufficiently hot to run this character of work, so gated as to keep the liquid metal actively moving and using proper pouring techniques, are not influenced by any provision of additional mechanical venting. Nor is additional mechanical venting necessary to insure running the castings, or to permit any mold cavity to run full and sharp at any point, provided permeability of the sand is over 40.

In the writer's opinion, too many so-called "strain gates" (which do not function as such to eliminate swells), "flow offs" and "popsticks" could be eliminated, since they serve only as vents, and fill with metal which later must be removed. Frequently voids, blows, trapped air and dirt are found under such vents, and all such defects must be chipped out for welding.

How important mold venting is in ferrous foundry casting is not known, but it is likely far too much importance is placed on any advantages of the practice, at least when sand permeability is above 40.

The writer once was connected with a foundry which for a long period experienced difficulty in producing porous-free castings. As a remedy excessive venting of the molds up through the copes was recommended, although sand permeability was above 200. Sands were changed; coarse sands were introduced; and after a few months the epidemic finally seemed to have run its course.

Metal Entered Vent Holes

A large percentage of the work was light in section and required very hot metal, particularly since the greater portion of the metal was transported to the several molding floors and poured from two-man shank pots. When the molds were shaken out, the sand-blasted castings resembled porcupines, because the metal invariably ran to unbelievable lengths through the openings created by venting. Close examination of the castings before the cast vents were removed disclosed many instances of skin rupture at the re-entrant angle formed by the vent and the mold face. These ruptures were caused by atmospheric pressure.

It was also observed that many of the cast vents were only hollow tubular sections down to and, in some instances, below the contour of the castings. Possibly this condition resulted from the hot head of metal receding—aided by atmospheric pressure—into the mold cavity, leaving only the thin solidified tubular walls.

Is there a steel foundry which has not experienced epidemics of porosity and immediately set about doing several things that, at least theoretically, offered relief? These steps include the removal of a greater percentage of fines; introduction of various percentages of coarse sand; much venting of molds both up and down through, and down to the pattern in the drag, resulting in much abuse to patterns, in order to "open up the sand." Opening up the sand has become almost fixed in the industry as the only remedy, in addition to immediately doubling the amount of aluminum per ton, followed by still other additions to shank pots, reducing moisture content of sand mixtures, and air or skin drying a larger percentage of the molds.

(*Continued on page* 242)

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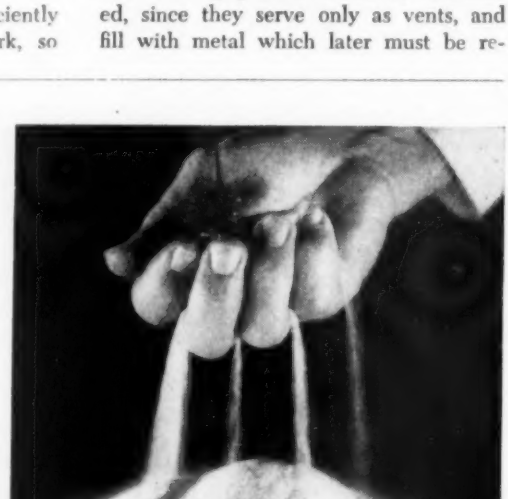

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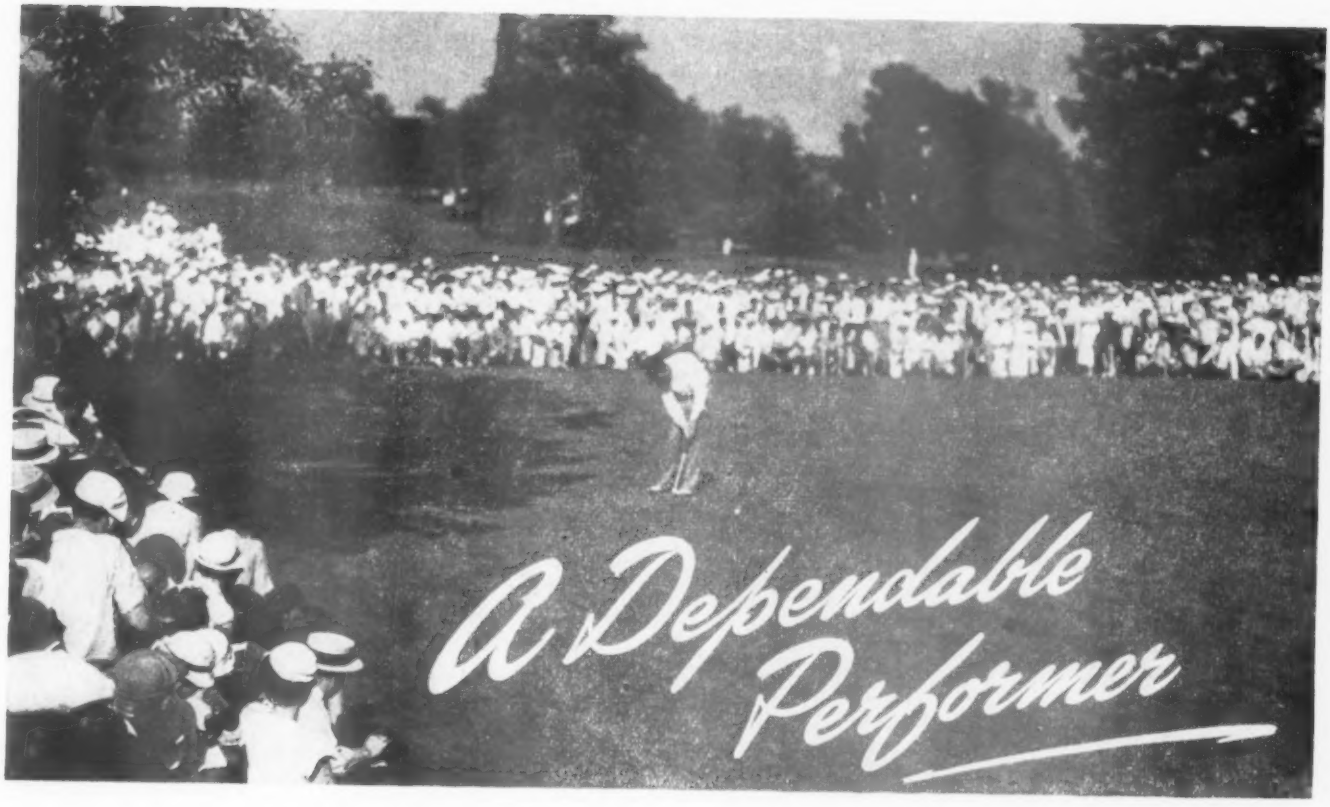

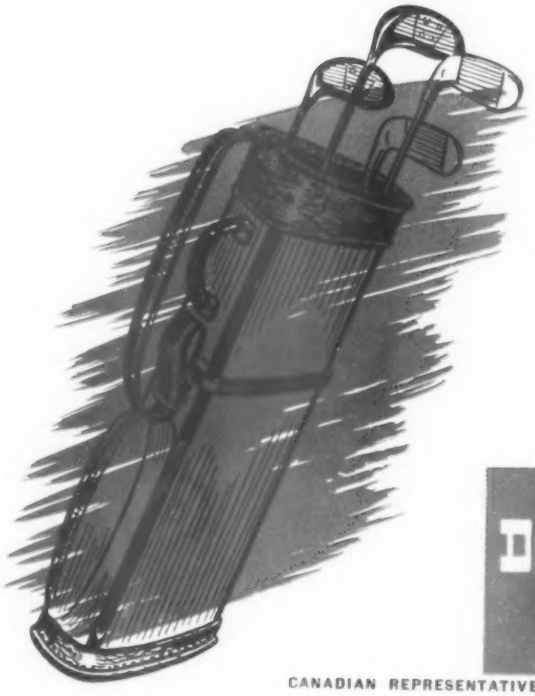

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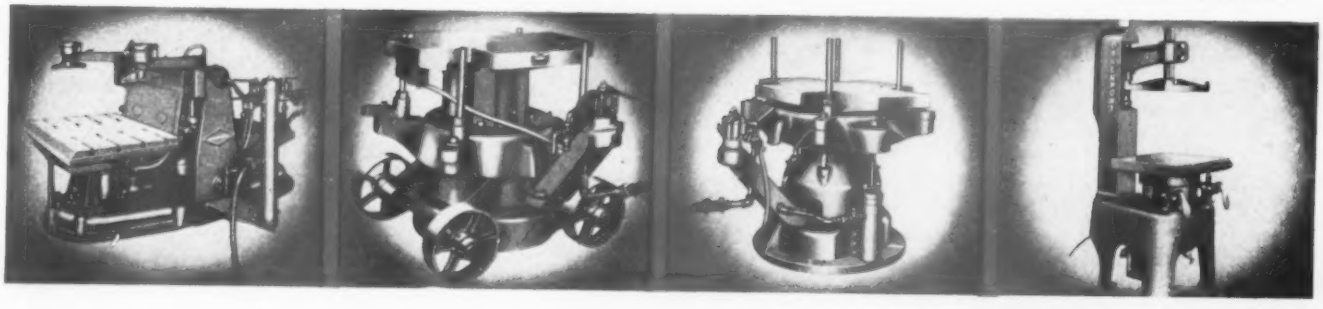

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Eventually, all of these things are done, conforming to the master pattern and advocated by the metallurgical department. Unfortunately, they do not fix the cause, and leave the foundryman no wiser after an epidemic than before.

Until recently, no one, at least to my knowledge, has ever questioned the practice of venting. But if the practice serves no good purpose, and is one of the causes for dirt and only adds to the costs of making castings, why continue it? The industry cannot afford to pass up any change of technique, methods, new facilities, supplies or materials that will offer only a small portion of the savings possible by discontinuing venting.

In the average steel foundry the handling of shop orders and patterns is about as follows: The type and number of patterns are decided and those patterns to be board-mounted for machine molding are sent to the pattern shop. Having selected the type of molding machine, patterns are located on the boards in conformity with heading and gating practice, under direction of some person or planning committee. It is at this point that the matter of venting is discussed, and the number, size and locations of vents are decided upon.

Most foundries provide such markings by attaching to the patterns various lengths of different sizes of inverted leather fillet, strips of sheet lead, many sizes and designs of upholstery tacks, triangular and rectangular pieces of wood, wood dowels, wood seats for strain gates, flow-offs and popsticks. The last named becomes a regular part of the equipment. Instructions as to the kind and size of vent wires to be used are sometimes included in the legends marked or painted on the equipment.

Considerable skill is required by the person carrying out the instructions on venting, particularly when withdrawing the vent wires so as not to dislodge portions of the mold face at right angles to vent openings. To those who advocate the flat or rectangular vent in preference to the round vent the question is asked "Why vent at all?" The promiscuous and generally careless method of venting by jabbing a lot of wires up through the copes of molds, particularly when a molder's lifter is used, is one of the chief sources of dirt.

Venting Wastes Time

When metal is sufficiently hot to run the type of castings being made, it will be observed that vent openings invariably will run with metal which later must be removed. Thus we have rounded out a useless sequence of operations: Pattern time to indicate vents; venting molds; molder's time; cleaning time for removing vents; loss of metal which reduces yield; dirt created which requires additional cleaning time cost for chipping out defects for welding; together with the effect on items of material. Elimination of the vents in molds into which molten steel is poured will improve (1) quality, (2) increase production, (3) decrease the cost of the product, and (4) speed up deliveries.

The problem of making castings free from pinholes is largely one of making the right kind of metal in the furnace. It is not, as foundrymen often were told, the result of insufficient vents, excess moisture in the sand, sand too tight, sand not sufficiently permeable, sand rammed too hard or too soft, pieces of wood in the sand, too many fines, wet or undried cores, oxide on lip of ladles, damp ladles, or "just a molding condition" or "a job which would be better made upside down."

Is there a steel foundryman who has not racked his brain with the problem of how to overcome blow-off of small bosses into which chills or chill nails were placed? This applies more gen-

(*Concluded on page* 244)

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(*Concluded from page 242*)

erally to smaller work, such as is made in slip flasks on jolt squeeze machines, where the displacement of mold cavities is restricted. Factors which must be considered in arriving at the probable cause for this condition include: (1) displacement of the mold cavity, (2) size of the chill or chill nail used, (3) moisture of the sand, (4) location of the boss, and whether it is in the path of the flow of metal or at the end of mold cavity, and (5) time elapsed between closing and pouring of the mold.

In the writer's experience the only remedy for such defects is to provide a large enough reservoir at such points, so that sufficient liquid metal is present to generate into steam the total amount of moisture accumulated and attracted to the solid in its passing. These reservoirs cannot be classed as vents, but actually are small risers, since they invariably provide some feed metal to the casting after the violence of the metal (the result of hot liquid metal coming in contact with water) has subsided. This provides a distinction between vents or "flow-offs" and risers.

The number of steel foundries which have discontinued all venting of molds is not known, but those foundries which have dropped the practice show definite savings of $6 to $10 a ton on jolt-squeeze or slip flask work.

Today, all possibilities of savings in the cost of making steel castings should be investigated. A thorough study of operations in each department should be made, preferably by a committee, to determine not only just how each operation might be improved but to eliminate any which are not reflected in the final product. Elimination of venting may meet opposition, but a full realization of the necessity for reducing costs, followed by careful experimentation—particularly to determine whether the metal is sufficiently hot to run the character of work selected for experimentation—will, in time, prove that venting does not contribute to the running of metal in any mold cavity.

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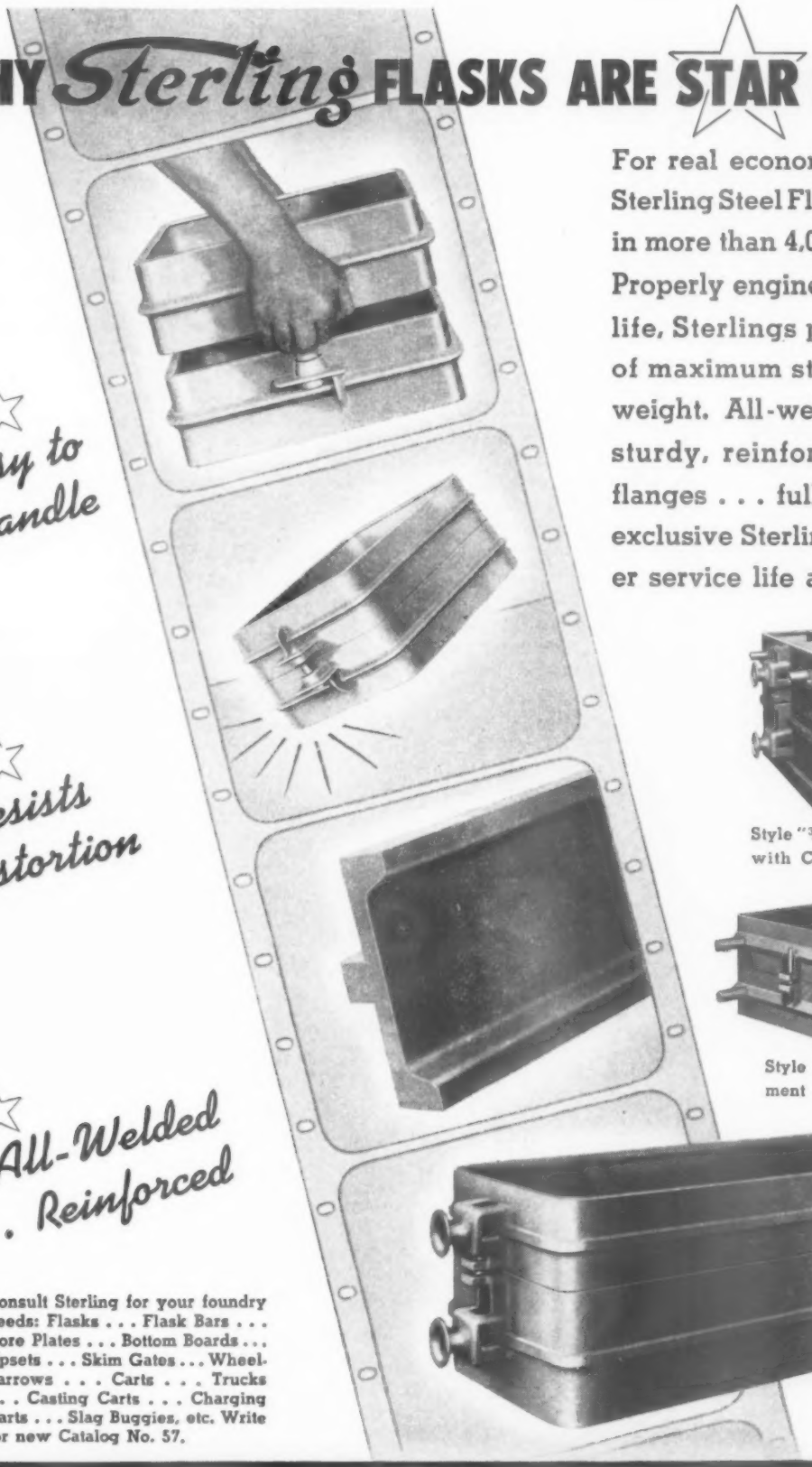

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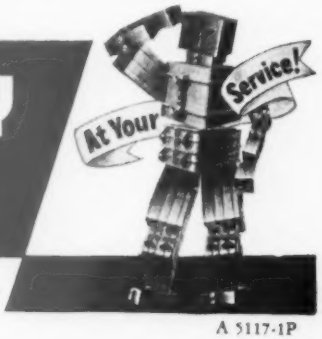

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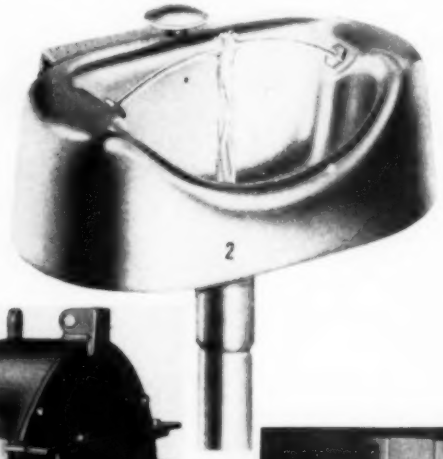
New Equipment and Supplies

1

(1)—Hand Hoist: Chisholm-Moore Hoist Corp., 624 South Michigan Ave., Tonawanda, N. Y.—High-speed hand-operated hoists are said to be 96 per cent mechanically efficient, 45 per cent lighter and contain 42 per cent fewer parts than other hoists of comparable capacity. They are constructed of steel and aluminum alloys, and all rotating parts are fitted with precision ball bearings that have double sealed-in lifetime lubrication. One of the features is that an extremely light pull is sufficient to unlock the brake and lower the load which is under perfect control at all times. Hoist is available in 1/4, 1/2, 1 and 2-ton capacities.

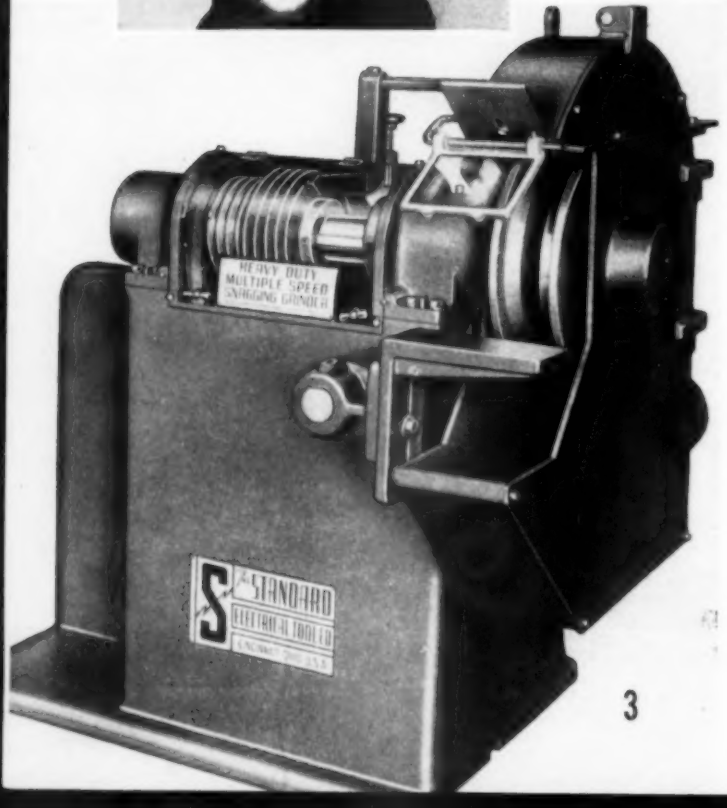

2

(2)—Eye Washing Fountain: Benson & Associates Inc., 332 South Michigan Ave., Chicago 4—Eye washing fountain has been developed for the immediate flushing of eyes that have been exposed to irritating vapors, liquids, dusts, chemicals, or smoke. The eye washer is essentially a double fountain with standard inlet and drainage connections. Openings are so arranged that two streams of water are directed against the eyes simultaneously. Cast aluminum bowl is designed to fit the upper contours of the face, and the actuating valve is operated by resting the head on the upper portion of the bowl, thus making it necessary to keep the eyes in the ideal range for the streams of water. Fountain is manufactured by Precision Scientific Co., Chicago.

(3)—Grinder: Standard Electrical Tool Co., 1207 River Rd., Cincinnati 4—Single end two speed snagging grinder has interlocking speed control to prevent overspeeding of grinding wheel. Safety hinged steel door guard is adjustable to compensate for wheel wear. Equipment includes exhaust outlet, adjustable spark breaker, safety glass eye shield and shaft lock for use in changing wheels. Working surface of the work rest is given as 4 x 9 in. Grinder is available either for right or left hand operation, for vitrified or resinoid bond wheels and in sizes for wheels ranging from 10 to 30 in. The 24 in., two speed, 10 hp model is shown here.

(4)—Cope and Drag Plates: Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11—Master cope and drag plate set for jolt stripper

(*Continued on page* 248)



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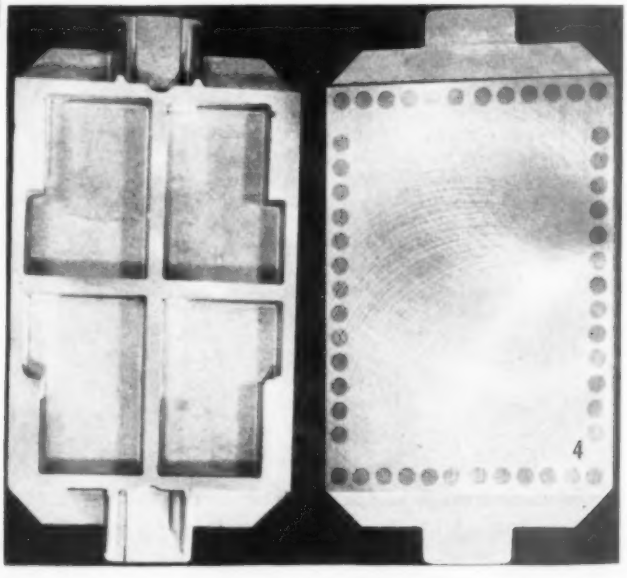
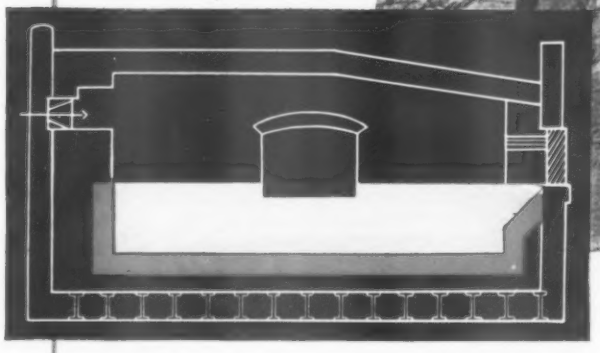

4

ILLUSTRATING THE EASE WITH WHICH ALUMINUM DROSS CAN BE REMOVED FROM TAYLOR ZIRCON BRICK.

SECTION THRU AN OIL FIRE REVERBERATORY TYPE ALUMINUM RE-MELTING FURNACE. TAYLOR ZIRCON HEARTH AND SIDE WALLS INDICATED IN RED.



TAYLOR ZIRCON *for the Aluminum Industry*

Zircon Refractories have the peculiar property of not being readily "wet" by aluminum metal, dross, or oxide. The true specific gravity of Taylor Zircon is 4.46, so any spalls or small particles of Zircon will not float in aluminum or the common alloys. Practical experience has shown conclusively that Taylor Zircon brick hearths, bonded with our No. 701 Zircon Cement offer these advantages over hearths built of fire clay, super duty, high alumina or silicon-carbide brick:

1—Cleaner Metal,

2—Increased Production,

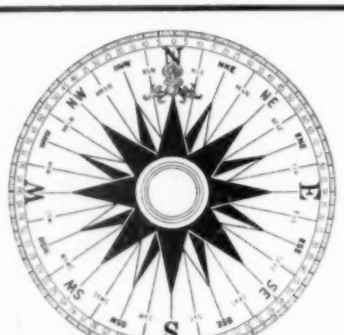
3—Lower Hearth Cost per ton of metal.

Properties of TAYLOR ZIRCON REFRACTORIES and other interesting data are given in Bulletin No. 201. Write for yours.

CHAS. TAYLOR SONS Co.

MANUFACTURERS OF REFRACTORIES • CINCINNATI • OHIO • U. S. A.

EXCLUSIVE CANADIAN REFRESENTATIVES. Refractories Engineering & Supplies, Ltd., Hamilton, Ontario, and Montreal, Quebec



You can look for variations in a mariner's compass, but there's no use looking for them in any

ASBURY GRAPHITE MILLS PRODUCTS

The same consistently good qualities are always found in Asbury

KLEEN-A-KAST
AN OUTSTANDING SHAKE-ON FACING

STOCKS LOCATED IN
Chicago, Milwaukee, Detroit, Denver, St. Louis, Houston, Cincinnati, Los Angeles, San Francisco, Seattle, Portland, Vancouver.

DIAMOND BLACKING PIPE REDUCER
CARBON AND NON CARBON

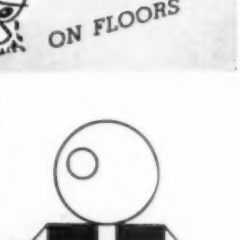
THE ASBURY GRAPHITE MILLS, INC.
ASBURY, N. J.

It's a hazard to health and production

A HOFFMAN PORTABLE UNIT

Vagrant dust, sand and other particles that wander about your foundry imperil workers' health—jeopardize your production. Rout them quickly and completely with Hoffman Vacuum Cleaning equipment—long the standard dust removal system for leading foundries. Free Engineering Service and full details on request.

HOFFMAN SPECIALIZES IN VACUUM CLEANING SYSTEMS FOR INDUSTRY



U.S. HOFFMAN MACHINERY CORPORATION
AIR APPLIANCE DIVISION, 111 FOURTH AVE., NEW YORK

(*Continued from page* 246)

or jolt rollover molding machines are cast aluminum, ground to close tolerances. Tough steel buttons are cast integrally along the flask line to help reduce flask wear. They also eliminate the necessity for the operations required when steel strips are placed along the edges. Buttons cannot be loosened by jarring. Plates are available in a variety of sizes or can be made to order.

Furnace: Thermo Electric Mfg. Co., 474 West Locust St., Dubuque, Iowa—Electric furnace features new type of stepless heat control. Any desired temperature between 500 and 1850 F can be selected and automatically maintained by adjusting control knob on

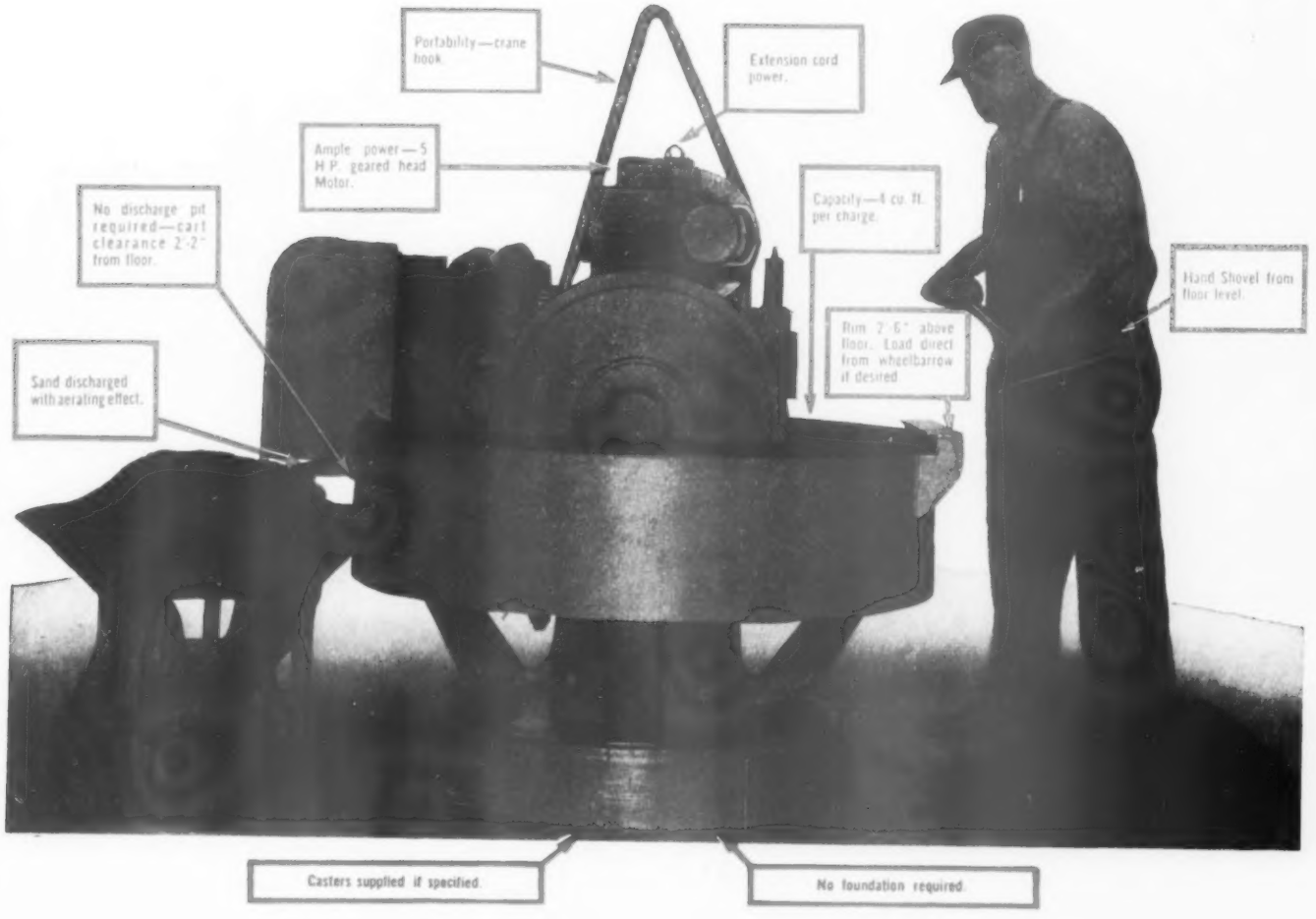
front of furnace. Control is nearly 100 per cent compensating for normal fluctuations in line voltage, and is available for use on dc or ac of any cycle. Heavy gage alloy heating element is embedded in sides, top and bottom of heating chamber which measures 4 in. wide, 3 3/4 in. high and 3 3/4 in. deep. Body and door are one-piece aluminum castings. Furnace is equipped with indicating pyrometer calibrated in both Fahrenheit and Centigrade. Complete furnace weighs 15 1/2 lb.

Refractory Castable: Babcock & Wilcox Co., 85 Liberty St., New York 6—Concrete has been developed for use as a refractory castable in the construction of industrial furnaces operating at temperatures ranging from the top limit of standard refractory castables up to as high as 3000 F. It can be poured into place like ordinary concrete or used as a ramming mixture. Thus it can be used for the quick fabrication of special shapes or to form part or all of the furnace lining. It is said to have high stability and resistance to spalling, small volume change on initial firing and minimum shrinkage or expansion under continuous use at high

(*Continued on page* 250)

Check the Advantages of This CLEARFIELD MIXER

This Clearfield Mixer has a very wide range of utility. A self-contained, single muller unit complete with base and drive, it is built for heavy production work. Small and compact with a clean discharge, it is ideal for small foundries where one mixer is used for all sand preparations. In larger, departmentalized foundries one of these machines may be used for each class of sand required. Write today for complete information.


Portability—crane hook.
Extension cord power.
Ample power—5 H.P. geared head Motor.
No discharge pit required—cart clearance 2'-2" from floor.
Capacity—4 cu. ft. per charge.
Rim 2'-6" above floor. Load direct from wheelbarrow if desired.
Hand Shovel from floor level.
Sand discharged with aerating effect.
Casters supplied if specified.
No foundation required.

CLEARFIELD MIXER

FAST, THOROUGH SAND PROCESSING

CLEARFIELD MACHINE COMPANY

CLEARFIELD PENNSYLVANIA, U. S. A.

Alnor

PYRO LANCE
built for foundry service

The rugged, shock resisting pyrometer movement and the enclosed extension thermocouple make a unit especially designed for foundry service. It is easy to secure the quick, accurate temperature readings which are so important in the efficient production of sound castings.

The Alnor Pyro Lance is especially designed for use with molten brass, bronze, copper, aluminum and magnesium alloys and similar metals where temperatures are not over 2300° F. With its enclosed thermocouple the Pyro Lance takes true temperatures below the surface, unaffected by dross or surface conditions. Write for descriptive bulletin.

ILLINOIS TESTING LABORATORIES, INC.
420 NORTH LA SALLE STREET
CHICAGO 10, ILLINOIS

NEW HEAVY-DUTY CART
WITH "3-POINT LANDING"

Here's just the cart you need for wheeling *coal, scrap, chips, turnings, borings* and similar heavy materials. All-steel, completely welded and reinforced. Made extra strong and rugged for heavy duty service. Dumps easily. Rests securely in any one of the three positions shown here. Available with roller bearings, if desired.

Write for Circular No. 50.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

(*Continued from page* 248)

temperatures. The material is supplied in ready mixed, dry form requiring only water to make it ready for use.

Ventilator: Swartwout Co., 18511 Euclid Ave., Cleveland — "Straight-through" type roof ventilator is made in five sizes with a wide range of capacities. Unit uses a propeller type fan to exhaust heat, smoke, fumes,

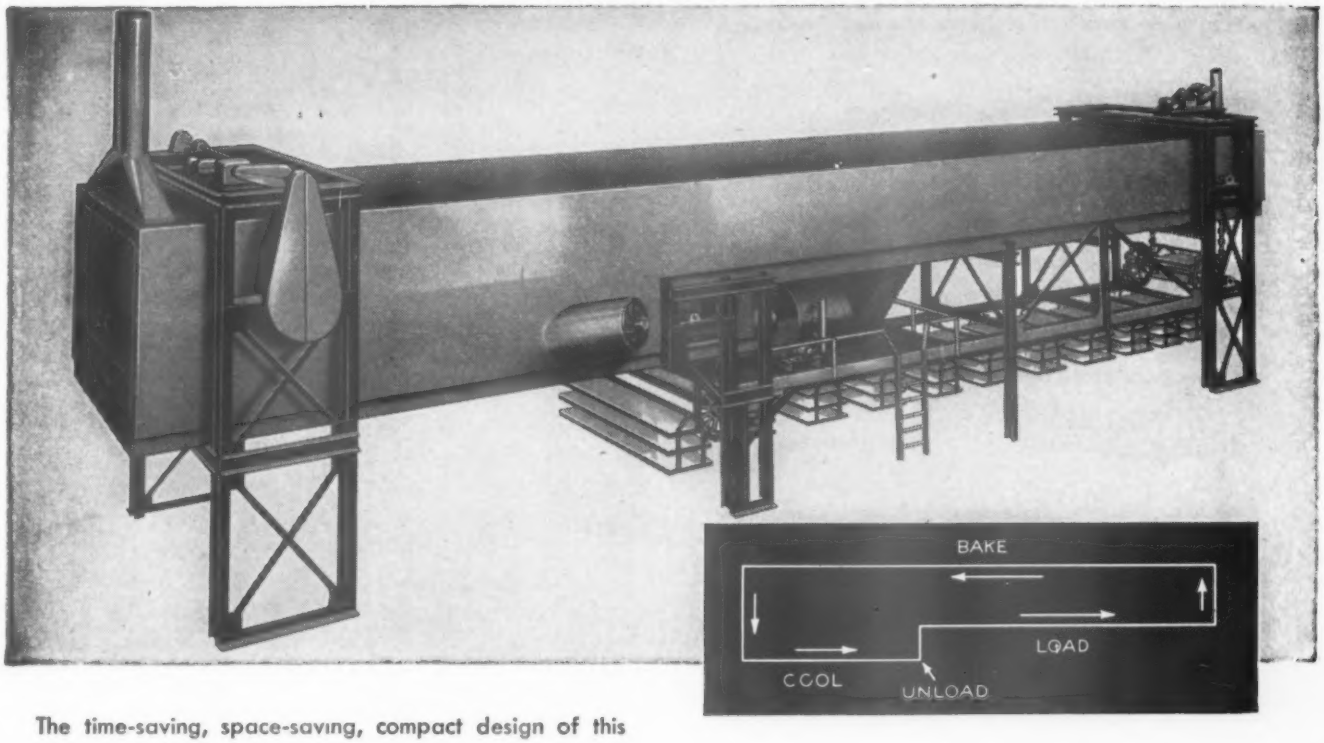
etc. through a divided top which opens and closes automatically. Ventilator is weather-tight at all times.

Air Compressors: Sullivan Division, Joy Mfg. Co., Oliver Bldg., Pittsburgh 22—Two-stage, air cooled stationary air compressors are available in 9 sizes with power requirements ranging from 15 to 100 hp and piston displacements from 81 to 590 cfm at 100 psi, based on 60 cycle motor speeds. Three standard electric drives include built-in motor, direct-connected motor and V-belt drive. Compressors may also be equipped for use with gasoline or diesel engines.

Rust Remover: Allied Products Co., Dept. R145, 1133 West Newport St., Chicago 13—Liquid chemical removes rust from any metal surface. It requires no rubbing, and it is said to be nonexplosive, noninflammable, and noninjurious to metal or the hands of the user. It will remove rust coating up to ¼ in. thick, and long immersion of the metal leaves the surface with a blue-black oxidized finish which increases its resistance to further rusting.

Transformers: Lindberg Engineering Co., 2444 West Hubbard St., Chicago—Air cooled transformers have been developed for use with electric furnaces, testing functions and various applications requiring heavy current. They feature a built-in wiring compart-

(*Continued on page* 252)



The time-saving, space-saving, compact design of this new Horizontal Core Oven is characteristic of Young Brothers' Engineering. Into it went the skill and confidence of many years of experience . . . also a thorough knowledge of the job to be done and the production problems involved.

This new core oven can be installed in practically any building without making any major structural changes.

The coremakers are located right next to the oven so that they can load the cores directly on the moving racks thus eliminating the necessity of transporting them on hand trucks or a conveyor from the core room. The location of the coremakers, at the oven, also saves core room space.

The size of the loading racks can be varied and the shelves can be adjusted to accommodate cores of many sizes and shapes.

Besides allowing for the removal of exhaust gases at the point of greatest concentration, the new oven design provides an effective cooling zone for the cores and assures comfortable working conditions for the coremakers.

This New Horizontal Core Oven is Young Brothers' answer to the demand for better core baking equipment. It is YOUR answer to the need for lower production costs and higher operating efficiency.

New HORIZONTAL CORE OVEN . . . . .

offers many cost saving advantages!

MEMBER

YOUNG BROTHERS COMPANY

6508 MACK AVENUE DETROIT 7, MICHIGAN

ESTABLISHED IN 1896

PORBECK DRAWER TYPE OVENS

GAS OR OIL FIRED
WITH RECIRCULATING
AIR HEATERS

UNIFORM CORES CONTINUOUSLY WITH LOW COST OPERATION

Strictly a *production* unit—note that all drawers operate independently of each other. Comes completely equipped with latest type temperature indicating controls (variable 100° to 650° F) and high efficiency recirculating air heater. Sturdy construction with 4-1/2" fibre-glass insulation throughout. Users commend Porbeck ovens for their space and time saving features. Available in several types and sizes. We invite your inquiry.

WRITE FOR NEW CORE OVEN BULLETIN "F"

PORBECK MANUFACTURING CO.

Manufacturers since 1894 of Core Ovens, Mold Dryers, Processing Ovens, Mold Drying Ovens, Heat Treating Ovens, and Paint Baking Ovens.

2600 N. Ninth St. **St. Louis 6, Missouri**

Up Nights with PATTERN LUMBER Problems?

It's unnecessary now that DOUGHERTY PERFECTION PATTERN LUMBER is available! Processed in our own kilns—using only old growth logs to give you patterns that resist cracking and warping. Here's lumber that will reduce pattern costs because it is easier to work and has fewer flaws. Call or write the Dougherty plant nearest you for complete information.

Hardboard for templates and lagging, dowels and bottom boards—skids and crating for large machinery and castings.

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YOUNGSTOWN 8, OHIO
Phone 4-4406

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Phone Diamond 1200

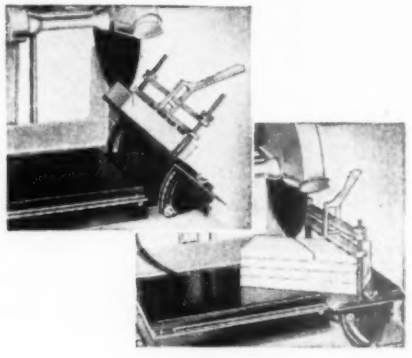
KEYSTONE
PITTSBURGH 3, PA.
Phone HEmlock 0700

LUMBER COMPANY

(*Continued from page* 250)

ment and terminal board. Tap switches to handle up to 500 amps are available for all transformers. Sizes obtainable are rated from 1 to 100 kva, up to 600 v, single phase, 3 phase, or 3 to 2 phase.

Saw Clamp: Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.—Masonry saw clamp makes possible cutting intricate shapes and sizes angle cutting or straight cutting of regular brick, tile and firebrick. Clamp is mounted on an adjustable conveyor cart and is designed to handle masonry in thicknesses to 5 in. and widths to 12 in. Two styles are



available: No. 45, for model H and J Clipper masonry saws, which elevates 45°, and No. 90 for models B, C and E saws — a nonelevating design for angles and straight cutting.

Power Winch: David Round & Son, Broadway & Henry Sts., Cleveland —5-ton capacity power winch is fitted with a V-belt pulley connected to a 2-hp reversible type motor. It is equipped with an automatic friction disk-type brake which provides necessary safety and control for lowering and suspending loads. Pawl may be lifted from ratchet by means of counter-weighted lever releasing friction brake and permitting cable to be run out as rapidly as desired.

Ring Cutter: Industrial Products Co., 2827 North Fourth St., Philadelphia 33—Finger ring cutter eliminates filing and other improvised method of removing ring from injured finger. Small replaceable, circular saw is manually turned by a wing nut and cuts all common metals. Overall length of instrument is 6 in.

Die Casting Machine: Ermac Co., 1426 South Santa Fe Ave., Los Angeles 21 — Self-contained die casting machine is suitable for intermittent production die casting work. Measuring 22 x 72 in. and 40 in. high, the machine features single hook-ups for air, gas and 110 v electrical current. It comes furnished with necessary blow

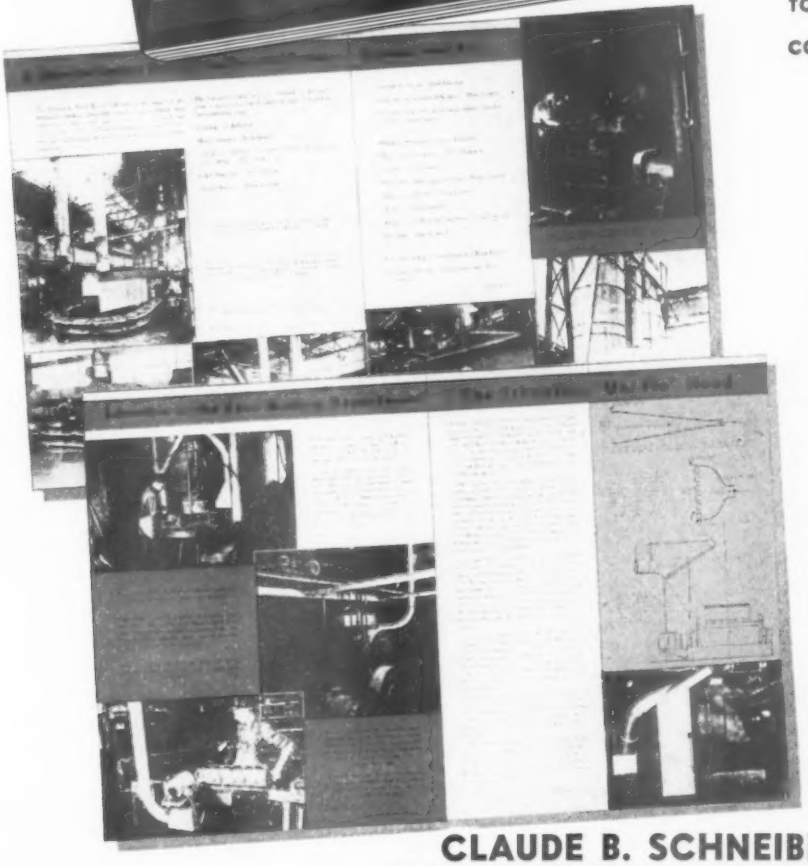
(*Continued on page* 254)

What Every Foundryman Should Know About DUST CONTROL!

An advanced concept in foundry dust control and ventilation is presented in Bulletin 47, "*Schneible in the Foundry Industry*"—which is just off the press.

Clean air in all working zones is the standard of American foundries today. That this is profitable has been abundantly demonstrated. Complete dust control and ventilation cannot be obtained by merely installing dust collectors. How clean air throughout the foundry may be assured at the lowest ultimate cost is shown in this new bulletin.

Numerous installations in well-known foundries are pictured. Send for your copy today!



It's All Here!

Proper hooding of dust-creating operations.

Correctly engineered ductwork.

Correct ventilation to provide make-up air.

Cupola collectors and slag disposal systems.

Velocitraps to recover re-usable steel abrasives.

Multi-Wash Collectors in which the fouled air is thoroughly purged of contamination.

Central dewatering systems for separating water from sludge for further use in the collector system.

Auxiliary equipment for all requirements.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St. • Detroit 16, Michigan
Engineering Representatives in Principal Cities

SCHNEIBLE

LIQUID-VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION

ABRASIVE WHEELS with a BETTER RESINOID BOND

Here's a BETTER high speed abrasive wheel for shops whose needs are unpredictable. KEYSTONE RESINOID WHEELS. . .

- Combine the best qualities in abrasives.
- Give you a versatile family for your need.
- Do it **faster** and more economically.
- Have exceptional abrasive power.
  Great Strength and Rigidity.
- Assure **longer life** and accuracy.

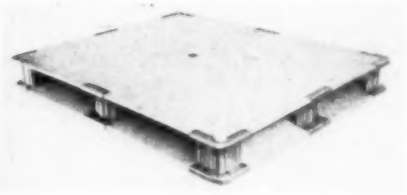
Our engineering service and research laboratory is maintained to solve your abrasive problems. Use it freely and frequently.

KEYSTONE ABRASIVE WHEEL INCORPORATED
RESINOID AND VITRIFIED
CARNEGIE, PA.

(*Continued from page 252*)

torches for properly heating goose-neck and nozzle. Standard equipment also includes pyrometer, thermo coupler, holding furnace and venturi type gas burner. Holding pot has a capacity of 300 lb zinc alloy. Machine is easily operated and maintained.

Pallets: Clark Tructractor, Division of Clark Equipment Co., 258 West Champion St., Battle Creek, Mich.—Durable pallets constructed of 5/8-in. plywood decks and posts of plywood



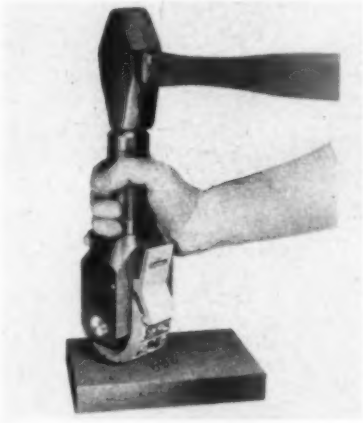
blocks or metal are light in weight. They are double faced, designed for four-way fork entry, and can be furnished in metal post construction for use with hand-lift or motorized pallet trucks. Sizes range from 30 x 40 in. with 2-in. vertical clearance and weighing 36 lb, up to 48 x 60 in. with 3 3/4 in. clearance weighing 89 lb. Capacities are 4000 lb carrying load and 16,000 lb static load.

Hand Truck: Sage Equipment Co., 110 Auburn Ave., Buffalo 13—Hand truck features all-welded steel construction, rubber-tired ball bearing wheels and large nose plate. Comfort-

able grip handles of curved 3/4 in. pipe and curved or straight back add ease of handling for loads up to 500 lb. Truck height is 51 in., width at top is 19 1/2 in., at nose, 14 1/2 in. Weight is 43 lb.

Temperature Indicator: Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44—High speed indicator makes it possible to log a large number of thermocouple temperatures in a short time. To read a temperature, operator flips a key switch marked for the desired thermocouple; the instrument's drum scale spins and stops at the correct temperature. Indicator has high sensitivity and accuracy, even for low temperatures and short ranges, and a single instrument will handle more than 100 thermocouples. All the more commonly used ranges for industrial thermocouples can be supplied.

Numbering Machine: Acromark Co., 327 Morrell St., Elizabeth 4, N. J.—Numbering machine has solid wheels set smoothly side by side in a precision one-piece solid bar stock alloy tool steel holder. Precision made numbering wheels turn readily although they fit snugly. Machine illustrated numbers up to 999 and locking of each wheel is accomplished by a solid lock that sets



into a depression between the characters. A locking fixture consisting of separate locks for each wheel is available on the machine.

Solder: All-State Welding Alloys Co. Inc., 96 West Post Rd., White Plains, N. Y.—Low temperature rub-on solder for aluminum work is applied without flux. It may be used for repairing blowholes, building up worn surfaces on aluminum castings and salvaging and making changes on foundry patterns. It has good matching color and fair corrosion resistance.

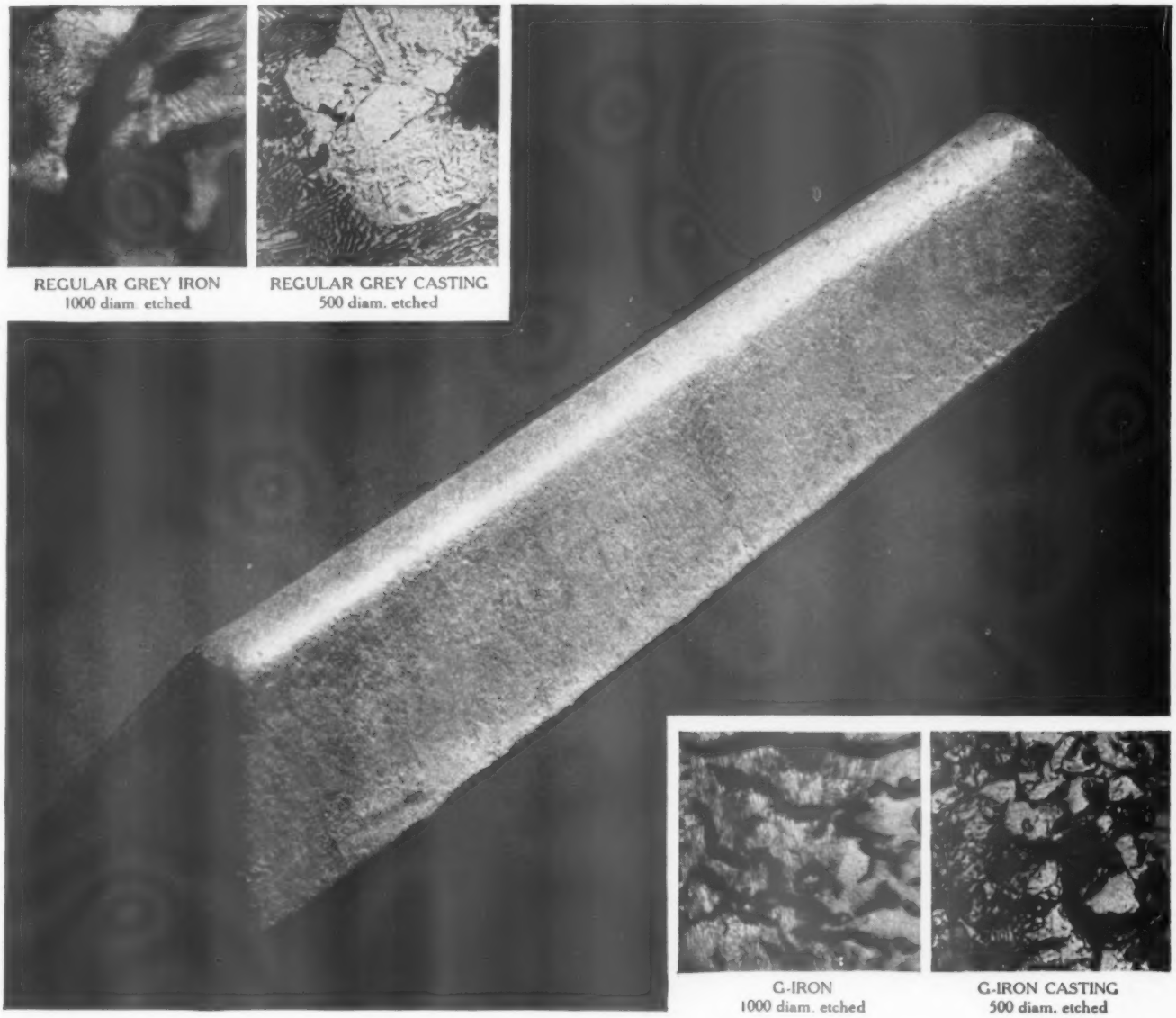
Cleaning Tank: D. C. Cooper Co., 1467 South Michigan Ave., Chicago 5—Gas-fired tank for cleaning metal parts is built of heavy gage metal. Tank may be equipped with steam coils where steam heating is desired. Unit is equipped with 4-in. heating pipes in the bottom of the tank. Fumes are removed through a duct which extends the length of two sides and back of tank, to which an exhaust fan can be connected. Tanks come with thermometer, drain,

(*Concluded on page 256*)

See how the grain refinement of **G-IRON*** follows through to the final casting

REGULAR GREY IRON
1000 diam. etched

REGULAR GREY CASTING
500 diam. etched



G-IRON
1000 diam. etched

G-IRON CASTING
500 diam. etched

*G-Iron is graphitized pig iron. A patented blast furnace process refines the grain structure of the pig—and this refinement follows through to the final casting. The finely distributed graphite increases fluidity and reduces chill in thin sections—improves machinability and helps overcome shrinkage and porosity between thin and heavy sections.

TONAWANDA
for sound castings

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

RADIANT Since 1879 FACINGS

MANUFACTURED IN OUR OWN PLANT...

DISTRIBUTED FROM OUR WAREHOUSE

BILL GAGGER SAYS:

RADIANT FACINGS will cut down your SCRAP LOSSES!

MAKING BETTER CASTINGS FOR 64 YEARS

•

WE MANUFACTURE

Core Compounds
Core Washes • Blackings
Plumbago • Seacoals
Parting Compounds
Tripoli—Low Silica—Liquid
Core Pastes and Binders
Shake Bag Facings
Anti-piping Compounds
"Ferrograph" Graphitizer
Special Facings & Compound

WE WAREHOUSE

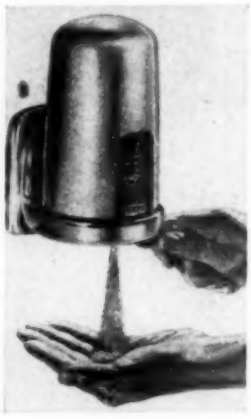
Purite • Goulac • Glutrin
Bentonite • Silica Flour
Soapstones and Talcs
Truline Binder

The Smith Facing & Supply Co.
1857 Carter Rd., Cleveland, Ohio

(*Concluded from page 254*)

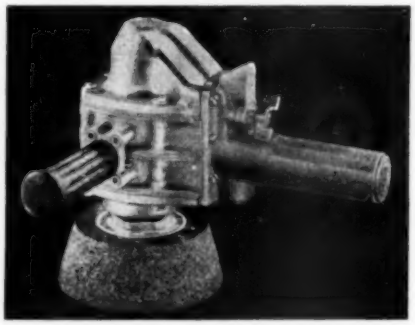
overflow connections and can be equipped with an automatic agitating device. Several models are available in a variety of sizes.

Soap Dispenser: West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.—New soap container dispenses a measured amount of double action, noncaustic powdered soap containing free lanolin. Made of enameled cold-



rolled steel with a chrome plated base the dispenser has no screw heads or other obstructions to prevent easy cleaning, will not clog, has no hinged or loose lids to get out of order and has a view window for checking soap supply.

Grinder: Rotor Tool Co., 17325 Euclid Ave., Cleveland 12— Vertical type grinder for use on large and small castings gives a flat, smooth finish, leveling off welds, removing gates, fins, ets. Cutting action is similar to straight surface grinders, cutting down the high spots, leaving a level surface without removing an excess amount of metal.

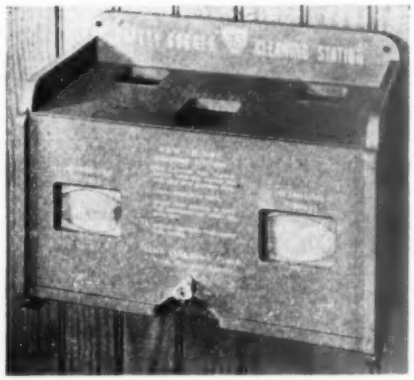


Weight of the grinder is 12 1/2 lb, height is 8 1/8 in. and speed is 3500 to 5500 rpm with 6-in. cup wheels. Grinder governor opens quickly and positively to deliver full air at high load speed as soon as pressure is applied to the work.

Electrode: Harnischfeger Corp., Welding Division, 4405 West National Ave., Milwaukee 14—New electrode for welding cast iron operates on ac or dc and produces welds which are strong, nonporous and fully machineable in both the weld and fusion zone areas. Most applications require no preheating or postheating and welds will withstand hydrostatic pressure. Known as Nicast, the electrode performs well in flat, vertical, overhead or horizontal work and is available in 1/8 or 5/32 x 14 in. sizes.

Cleaner: Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7—New general purpose cleaner is a dry, granular inorganic material that dissolves quickly in water, removes most types of soil easily and rinses rapidly. It is not a soap nor is soap necessary with its use. It can be used for general purpose janitor cleaning, in steam gun cleaning of painted or unpainted surfaces, tumble barrel cleaning, burnishing or deburring operations. Cleaner will not harm clothing or skin. It is available in 125 or 250-lb plywood drums.

Goggle Cleaning: American Optical Co., Southbridge, Mass.—Goggle cleaning station measuring 6 x 9 x 13 in. can be attached to a wall. Cabinet is of hardwood, lacquered green, and contains all necessary cleansing and anti-



fog materials. Directions for using the goggle cleaning station are printed on the front panel of the cabinet. Supplies of the lens cleaning fluid, cleansing tissues and antifog compound are obtainable from the optical company.

Drying Furnace: Nichols Engineering & Research Corp., 60 Wall Tower, New York 5—Vertical furnace for flash drying sand and other granular materials is adapted from the multiple hearth type furnace with accent on simplicity and low cost. Dryer is a vertical steel shell, lined with refractory and with a suitable number of hearths. Overall height of the kiln and the number of hearths are a function of the tonnage of sand and amount of water to be evaporated. It has no moving parts and is available with direct-fired gas or oil burners.

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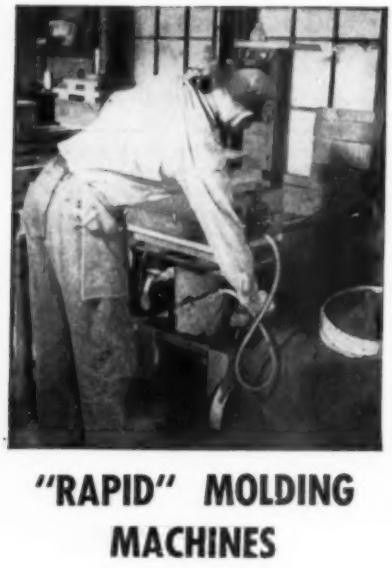

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SAVING FOUNDRY COKE

(*Continued from page 73*)

author's foundry, where the cupola operator controls his melting by pressure, to raise or lower the pressure in not more than 2 oz increments and not oftener than every 15 minutes.

Another means used in solving this problem, particularly where a rather high bed is maintained, is to leave out the coke charge just preceding the last iron charge. We have found that this may be done safely if the amount of blast is systematically reduced as the end of the blow is approached. It should be emphasized, however, that it is imperative in following this practice to systematically reduce the blast as the stock descends the stack.

Control of Metal Temperature — In some foundries where it is possible to segregate all heavy castings, there is a chance to save coke by lowering the melting temperature. Before pouring castings with rather large cross section thickness, most foundrymen will hold the iron for as long as 20 to 30 minutes in order to pour colder. Advantage can be taken of this by reducing the coke in the cupola, thereby melting colder with no detrimental effect on the casting, provided the iron is melted hot enough to free itself of impurities before entering the mold. This does not necessarily mean that we are endorsing cold casting temperatures. Most molders insist on holding the iron for a period of time in order to lose temperature, so we might as well take advantage of this procedure to save coke.

Many foundries are guilty of being careless about metal handling time, thereby wasting considerable heat which, of course, requires coke to develop. In many instances, the metal could be safely and successfully melted colder, thereby saving coke, if the metal itself were handled in a more efficient manner. If light, thin sectioned casting molds were located close to the cupola, extremely high melting temperatures might not be necessary to avoid misruns. A complete study of the location of the molding floors with reference to size and weight of castings could prove beneficial. In many cases the metal handling equipment is poorly designed and/or maintained, thereby increasing greatly the handling time with the resulting loss of heat. A thorough study of this transportation of metal problem in most plants would pay additional dividends in many other ways, as well as resulting in a saving of coke.

Ladles—Considerable temperature can be saved in the foundry if well insulated ladles are used. All receiving ladles in any foundry should, by all means, be insulated. It has been shown that from 75 to 100 F less temperature drop can consistently be had. This practice is not expensive since insulating brick can be reused if care is taken when knocking a refractory lining from the ladles just prior to relining. Additional temperature can be saved in every case where it is possible to insulate transfer and pouring ladles as well as receiving ladles.

Before using any ladle for handling molten metal in the foundry, it should be carefully preheated. The old method of preheating a ladle by pigging metal through it is not only useless but quite wasteful. In many foundries ladles are not even dried thoroughly, which not only causes a further dissipation of heat but harms the metal in many cases and at the same, is rather dangerous. It stands to reason that if a ladle is preheated to 2500 F, it will not reduce the temperature of the molten metal nearly so rapidly as if the lining were at atmospheric temperatures. It should be pointed out that in many foundries where ladles are preheated, a great deal of fuel is wasted because the torch is not properly regulated. Fuel will be wasted in any type torch unless enough oxygen is supplied to complete combustion. We should always remember that any metal temperature saved outside the cupola means that much need not be furnished in the cupola.

Cupola Drop Coke — A surprisingly large amount of usable foundry coke can be recovered each day from the cupola drop. Since a series of test runs have proved cupola drop coke to be of good quality, it has been standard practice in the author's foundry to recover this coke and use it during the following day's operation. A small amount of this drop coke is added to each coke charge replacing new foundry coke, and no detrimental effects have as yet been noted. In order to get the maximum recovery in this practice the drop coke should be quenched with water as quickly as possible to avoid further burning after the day's operation is over. It is neither difficult nor expensive to recover this coke, since the drop must be taken up each day.

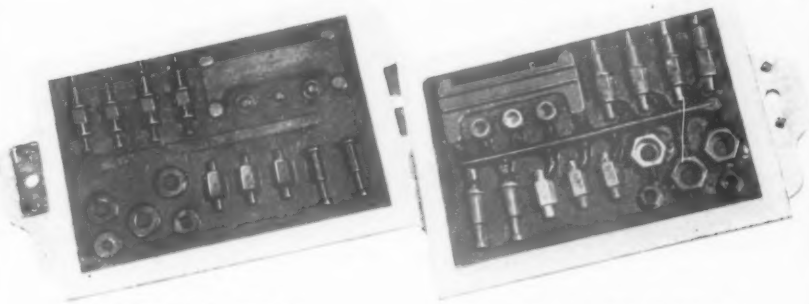
Preheating the Stock—In erecting new cupolas enough stack height above the tuyeres should be provided in order to take advantage of the heat from the effluent gases. This, of course, can be overdone but it is generally considered good practice to have at least enough height above the tuyeres to hold five charges. The hot gases ascending a stack so designed will have sufficient time to preheat the charge considerably before it reaches the melting zone, thus saving some coke.

Treatment of Coke — In foundries where rather high blast pressures are used, such as the author's, it is recommended that the coke charges be wet thoroughly just prior to putting them in the cupola. In stacks that hold six or seven charges and where the velocity of the effluent gases is rather high, this practice of thoroughly wetting the coke protects it from burning while up in the stack and saves it for the melting zone where it is needed when running with a minimum amount of coke. This practice does not interfere materially with the utilization of the latent heat of the effluent gases to preheat the descending metal charges. In this practice, the heat that would be used up in burning the coke—or at least part of it—is spent in driving off moisture in the coke in the form of steam. Coke dipped or sprayed with lime slurry would probably accomplish the same purpose, as well as being to some extent self fluxing.

In areas where pitch coke is available, it can be used advantageously in foundries operating with extremely lean fuel charges to quickly increase the temperature of the iron. This can be done effectively only by frequent pyrometer readings which indicate a slow decrease in temperature far enough in advance for the pitch coke to reach the melting zone. In the author's foundry this practice of the use of pitch coke as a medicine in the cupola has been practiced for a number of years. It should be pointed out, however, that if a very high percentage of pitch coke is mixed with the regular coke charge, more steel scrap must be added to the metal charge to avoid excessively high carbon in the iron.

Hot Blast—Preheated blast is one sure way to safely and effectively conserve foundry coke. There are several different methods for accomplishing this purpose, descriptions of which have been published in the literature. The particular one adopted by a given foundry will probably depend on individual shop conditions. The Barr and Holmes hot blast system used in the author's foundry saves from 10 to 15 per cent coke as compared with cold blast cupolas operated under similar conditions. It is claimed in some of the other types of hot blast that much greater savings of coke can be realized. The latest method of preheating the blast consists of burning low grade fuel outside the cupola to preheat the blast, and operating the cupola on a minimum amount of high-priced foundry coke. This method was described in a recent issue of the British publication, *The Foundry Trade Journal*.

Tuyeres—Clean bright tuyeres all during the melting period tend to help save coke. Where the tuyeres are partially



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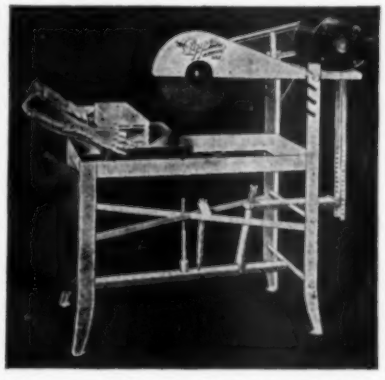

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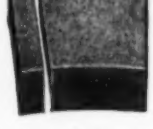

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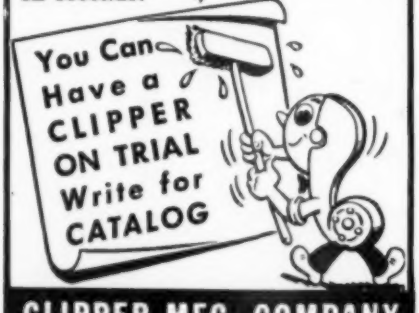

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blocked, a nozzling effect on the blast results, tending to oxidize the iron and causing the operator to charge heavier coke splits. The best method for maintaining bright tuyeres is to have each tuyere equipped with a valve so that the blast may be shut off individual tuyeres for short periods of time to allow the hot gases to melt away any obstruction. By alternately closing and opening these individual valves for short periods the tuyeres usually will remain bright throughout the entire heat.

In trying to maintain clean tuyeres, some operators resort to poking them periodically during the course of the heat. This probably helps, particularly if the obstruction can be removed from the furnace through the tuyeres. Another method that has been suggested is to place a small amount of powdered coal just in front of the tuyere that is partly blocked. Although this has not been tried in the author's foundry, the claim is that the intense localized heat caused by the burning coal will melt away the obstruction.

Cupola Flux—Flux is an important part of the raw materials going into the cupola, but it requires fuel to perform its function. If too much flux is used, fuel will be wasted and, therefore, in this problem of saving coke it is important to charge the proper amount. It should be pointed out that insufficient flux can cause serious trouble, and conservation of coke from this source should be attempted only through careful and precise experimentation. One way to reduce the amount of flux necessary to maintain a fluid slag is to charge only clean metal. This means that all gates and risers should either be rattled or sand blasted, and any metal loaded with a magnet should be screened before going into the charging bucket.

Boshed Stack—Some cupola operators recommend the use of boshed stacks, particularly where not very much stack height above the tuyeres is possible. By enlarging the stack more metal charges can be put in the cupola, thus exposing them to the latent heat of the effluent gases. This tends to give the same effect as a cupola with sufficient stack height to hold several charges. In this way all metal charges can be given some degree of preheat before they reach the melting zone.

Enrichment of Blast—Another method that has been suggested for conserving coke is to enrich the blast with oxygen. Little work has been done in this field, but it holds possibilities. It stands to reason that if the blast can be made to contain around 40 per cent oxygen, instead of 21 per cent, more efficient melting will result. The element we are seeking from the air in cupola melting is oxygen, and the other elements are more or less useless to the operation and, therefore, wasteful.

In conclusion, it should not be too presumptuous to remind the foundry coke manufacturers that they should be eternally working toward the manufacture of a higher quality coke, even though they may be forced to use raw materials that are continually deteriorating in quality. Constant experimentation should be carried out, such as the blending of synthetic material in the mixtures, or even to the extent of trying methods or procdures that may sound foolish to experienced coke manufacturers in order to accomplish this purpose. This is true because the surest and quickest method of conserving this scarce commodity is to raise its quality.

THEORY OF GASES IN COPPER-BASE ALLOYS

(*Continued from page* 83)

portional to the cube root of the SO_2 partial pressure.

The theoretical aspect of gases in metals, including the effects of temperature and pressure on adsorption and solution, have been summarized[12], and no further consideration of the phase of the problem need be made here.

Effect of Alloy Composition and the Role of Oxygen—While several tenths of 1 per cent of oxygen is soluble in pure copper melts, the maximum possible oxygen content of copper-base alloys will depend directly upon the composition. Before proceeding to this important subject, it is well to note that pure copper is subject to the two types of gas evolution; that is, copper castings may be unsound as a result of (1) hydrogen precipitation produced by the decreasing solubility of this gas when the melt solidifies, and of (2) steam formation by the hydrogen-oxygen reaction.[9] Since these same principles apply to the more complex alloys,[13] the effects of the alloy composition will now be considered in detail.

It has been noted that pure copper melts can be thoroughly oxidized, producing high oxygen or oxide content in solution in the melt corresponding to a very low maximum hydrogen content. Practically all commercial casting alloys having a copper base contain alloy materials which have a greater affinity for oxygen than the copper. Consequently, the percentage of oxygen or oxide possible in solution in the melt will depend upon the composition.

This condition is illustrated schematically by the curves of Fig. 5. In this chart, based on the law of mass action, the maximum attainable oxygen in solu-

tion in the melt as oxygen or as an oxide is indicated on the vertical axis. The horizontal axis shows the percentage of various reducing elements. These reducing elements are, of course, the common alloying elements and those existing as impurities. The top curve shows the maximum contents of oxygen and a mildly reducing element which can exist simultaneously in solution in the copper-base melt. These curves are not quantitative, and the top curve for a mildly reducing element might be representative of tin, corresponding to binary copper-tin alloys.

Oxygen Content Lower

The second curve from the top shows the maximum contents of oxygen and a moderately reducing element, but a more reducing one than tin, such as zinc which can exist simultaneously in solution in a copper-base melt. Because this moderately reducing element has a somewhat greater affinity for oxygen than the preceding example of a mildly reducing element, the maximum possible oxygen content corresponding to a specific amount of alloying element is necessarily lower. The third curve similarly shows the maximum contents of oxygen and a strongly reducing element, such as phosphorus, which can exist simultaneously in solution in a copper-base melt.[15] Because of the markedly stronger affinity of this reducing element for oxygen, the maximum oxygen content corresponding to a given percentage of such a strongly reducing element is still lower than the preceding example.

The two bottom curves are representative of the amount of oxygen which can exist simultaneously with hydrogen in solution in a copper-base melt. Two curves are shown, one, the uppermost curve represents data at a higher atmospheric humidity.[15] Thus, these two curves qualitatively show that with increasing moisture content of the surrounding atmosphere, greater maximum quantities of hydrogen and oxygen exist simultaneously in a copper-base melt. It should be emphasized again that these curves are not quantitative.

The maximum oxygen content which will exist simultaneously with various amounts of phosphorus in the 90-10 copper-tin alloy has been determined.[16] Three points on this curve are listed in the data on Fig. 5. Although phosphorus is a very strongly reducing element, the quantities of phosphorus and oxygen which may exist simultaneously are substantially greater than the amount of oxygen and the various gas-forming, reducing elements listed in Table I which shows the amount of these constituents required to produce 1 per cent voids in a solidifying copper-base alloy.

Referring again to Fig. 5, the effect of

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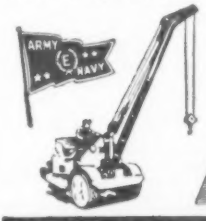

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alloying element upon the maximum possible oxygen content and corresponding maximum hydrogen content can be ascertained. Thus, if the alloy is copper base, containing a mildly reducing element, such as tin of composition Sn indicated on the horizontal axis, the maximum possible oxygen content is 0 on the vertical axis. Corresponding to this oxygen content, the maximum amounts of hydrogen which can exist simultaneously are represented by H for high humidity and H^1 for a lower humidity. If the binary alloy is copper and zinc with Zn per cent of the latter, as indicated on the horizontal axis, the maximum possible oxygen content is O_2. Corresponding to this maximum oxygen content are the maximum hydrogen contents of H_2 at high humidity and H_2^1 at lower humidity.

Because this alloy contains a more strongly reducing element than the preceding example, the maximum possible oxygen content is lower, and the maximum possible hydrogen content is correspondingly higher. If it is assumed that an alloy contains tin and zinc and a strongly reducing element, such as phosphorus, the maximum amount of phosphorus and oxygen which can exist simultaneously in solution in the melt might be represented by the third curve from the top. If we assume this copper-tin-zinc alloy had P per cent phosphorus, the maximum oxygen content that is possible is represented by O_1, and the maximum possible hydrogen content at this oxygen content is represented by H_1 for high humidity, and H_1^1 for the lower humidity.

It will be noted that as strongly reducing elements are added to the melt, the maximum possible oxygen content is lowered, and the maximum possible hydrogen content is correspondingly increased. In a like manner, the maximum amount of other possible reducing gases or gas-forming elements, such as sulphur, carbon, and carbon monoxide could also be increased.

Basis for Some Commercial Practices—The curves in Fig. 5 show the reasons for the following production practices and experimental observations:

1. The copper-base alloys containing only mildly reducing elements, such as tin, are most readily degassed by subjecting them to an oxidizing treatment,[16, 17] because the maximum possible oxygen contents are high with correspondingly low contents of reducing gases or possible gas formers, such as hydrogen, carbon, carbon monoxide, and sulphur. The introduction of oxygen will reduce these gases and gas formers to their equilibrium value. Thus, the oxygen would combine with the hydrogen to form steam and this reaction would proceed until the equilibrium hydrogen concentration was again reached. The attainment of this equilibrium may be aided by diffusion of hydrogen into the steam bubbles.

2. After the oxidizing treatment, it is necessary to deoxidize by the addition of a reducing element, such as phosphorus, in order to produce a low oxygen content in the melt as well as a low content of the reducing gases or gas-forming elements listed. If this were not done, the equilibrium of the oxygen in the melt with the existing reducing gases or possible gas-forming constituent would not be destroyed. During the process of solidification and the inevitable changes in composition of the remaining melt which would entail, the unsolidified portion of the melt would become richer in oxygen as well as in the gas or gas-forming constituent. The Reactions A, B, C, and D listed previously would then proceed to the right, forming gaseous, substantially insoluble compounds causing unsoundness in the casting.. If, however, the oxygen is removed by deoxidation after the oxidizing treatment, both the oxygen and the gas or gas-forming constituents are low in concentration, and the four reactions referred to cannot proceed further.[18]

Use Oxidizing Atmosphere

3. The use of an oxidizing atmosphere when melting copper-base alloys is universally recommended. To do so keeps the oxygen content of the melt at a maximum, and the gas or gas formers at a minimum.

4. It has been found that the use of various oxidizing materials,[15, 18] such as fluxes containing copper oxide, manganese oxide, etc., degas melts of copper-base alloys, or at least such fluxes degas those alloys which do not contain strongly reducing alloying elements. Such oxidizing slags obviously keep the oxide or oxygen content of the melt at a maximum. As explained in Item 2, it is, of course, necessary to remove this oxide or oxygen by a deoxidizing addition before pouring. It is obvious that this method of metal treatment would be most successful on copper-tin alloys and least successful on those copper-base alloys containing large amounts of a strongly reducing element, such as a high phosphorus content.[18]

5. Those commercial alloys containing strongly reducing alloying elements present the greatest problem in respect to the gas content of the melt. Likewise, such melts containing strongly reducing elements are the most prone to the absorption of gas or gas-forming elements. Thus, copper-tin alloys containing high phosphorus contents are more prone to

absorb gas from sand molds than low-phosphorus alloys.[18]

6. Alloys containing very low oxygen as a result of melting under reducing atmospheres are very apt to contain a high content of hydrogen or other possible gas-forming materials, such as sulphur, carbon, or carbon monoxide. Because of the low oxygen content, the Type 2 gas evolution may not occur, unless oxygen is absorbed or dissolved in the melt during the pour but, if not, Type 1 gas evolution may occur when the melt solidifies as a result of the decreased solubility of one or more of the five gases, hydrogen, carbon monoxide, carbon dioxide, sulphur dioxide, and nitrogen.

7. Alloys containing a strongly reducing element in substantial amounts, such as those containing high phosphorus, can most readily be degassed by passing an inert gas, such as nitrogen, through the melt[16] in the manner used for such strongly reducing melts as magnesium alloys and aluminum alloys.

Significance of the Equilibrium Constant—Curves, such as those shown in Fig. 5, represent the equilibrium concentration of different reactants and are based upon the law of mass action. If two or more constituents, A, B, etc., are in equilibrium with their reaction products, M, N, etc., the equilibrium constant K is given by the following formula:

$$nA + mB + \ldots \rightleftharpoons xM + yN + \ldots$$

$$Kc = \frac{C_M^x \cdot C_N^y}{C_A^n \cdot C_B^m}$$

In this formula representing the equilibrium constant, n and m are the number of reacting molecules, and x and y, etc., are the number of molecules in the reaction product; A and B, etc., are the reacting materials, while M and N, etc., are the reaction products. If these reaction products are a gas or vapor, their concentrations, C, may be expressed as their partial pressure in the atmosphere over the melt.

The mechanism of the equilibrium reaction is not entirely clear. Apparently, when at least one of the reaction products, M, is a completely insoluble gas, the equilibrium reaction is at the surface of the melt and the concentration of the reaction product, M, can be expressed only as its partial pressure over the melt. Thus, if H_2O is completely insoluble in the melt, the reaction $H_2O \rightleftharpoons 2H + O$ occurs at the surface, the hydrogen and oxygen atoms are adsorbed at the surface, and these adsorbed atoms in turn are in equilibrium with the dissolved hydrogen and oxygen atoms in the melt. If the reaction product, M, is a slightly soluble gas, then the equilibrium reaction may occur within the melt as well as at the surface, and the concentration factor C_M^x refers to the concentration of

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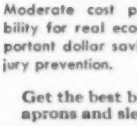

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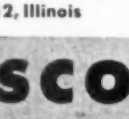

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M dissolved in the melt, or it may be expressed as the partial pressure of M over the melt.

When the gaseous reaction product escapes and there is no appreciable partial pressure of it over the melt, such as when an excess of phosphorus is added to a melt containing relatively high oxygen, the following typical reaction occurs:

2P (or a phosphide) + 5O (or an oxide) $\rightleftharpoons$ P_2O_5

The P_2O_5 escapes from the melt, but during this process, equilibrium is temporarily approached. As the P_2O_5 escapes, the reaction tends to proceed further to the right, but resistance to bubble formation may prevent a rapid escape of the P_2O_5 vapor. The above reaction may be assumed to proceed to the right until one of the reactants disappears as the P_2O_5 escapes one molecule at a time from the melt surface by evaporation. In actual practice, however, oxygen is slowly absorbed from the outside, and the melt is gradually depleted in phosphorus.

When the reaction produced is a liquid or a solid, the mechanism of the equilibrium reaction is even less clear. If, for example, oxygen and zinc exist simultaneously in a copper-base melt, a slight solubility of the zinc oxide in the melt is probably necessary in order to maintain the equilibrium between the zinc and the oxygen. In the formula just cited, the equilibrium constant K_e is determined at equilibrium conditions, using the concentration of the various constituents in the melt as indicated by the subscripts. The important matter is, however, that such reactions proceed up to a point at which the reactants in the melt and the reaction products in the atmosphere over the melt and/or dissolved in the melt are in equilibrium. When this condition is attained, the reaction products and reactants exist simultaneously in the system.

Expressed in another way, when equilibrium is established, K_r, the product of the concentration of the reactants (namely, the oxygen and the oxidizable element, which in the case of H, S, Cu_2S, CO, or C are gases or gas formers) is a constant, provided the temperature and the partial pressure of the reaction product over the melt is unchanged. This constant, K_r, increases with an increasing partial pressure of the gaseous reaction product in the atmosphere adjacent to the reacting zone; namely, in the adjacent voids or in the atmosphere surrounding the melt. Likewise, the constant referred to generally increases with increasing temperature. Thus, if the temperature of the melt is raised, the two bottom hydrogen-oxygen curves of Fig. 5 are shifted upwards parallel to the vertical axis.

The values of the constant, K_r, referred to above, have been determined for a number of gas-metal systems as follows:

Gas-Metal System or Reaction	Temp., F	Reaction Product	Partial Pressure of Reaction Product, mm., Hg	K_r*	Reference
C + O (in molten iron) $\rightleftharpoons$	CO 2900	CO	716	2.5×10^{-3}	20
2H + O (in molten copper) $\rightleftharpoons$	H_2O 2100	H_2O	234	0.5×10^{-10}	11
S + 2 O (in molten copper) $\rightleftharpoons$	SO_2 2200	SO_2	760	0.022	7

*Product of the concentration of the reactants in the melt—a constant for the given temperature and partial pressure of the reaction product.

These constants, such as those listed in the second column from the right, will decrease with decreasing temperature of the melt, which means that, if the reactants were in equilibrium, the concentration of the reactants must decrease by reacting and evolving the reaction product, a gas, by Type 2 gas evalution. As indicated, a similar relationship exists for oxygen and nongas formers, such as tin, zinc, and other alloy constituents in copper melts as shown by the curves in Fig. 5.

If the reaction product is very stable and substantially insoluble in the melt, such reactions proceed almost entirely to the right. For example, oxygen in aluminum combines thus:

$$4Al + 3O_2 \rightarrow 2Al_2O_3$$

and $$K = \frac{(\%Al_2O_3)^2 \text{ (in solution in the melt)}}{P_{O_2}^3}$$

where P_{O_2} is the partial pressure of the O_2 over the melt.

Since $C_{Al_2O_3}$, the concentration of Al_2O_3 in solution in the melt, is practically zero, K equals zero and the reaction proceeds to the right until it is completed; that is, until one of the reactants within the melt, such as oxygen in air bubbles, is completely eliminated. The same is apparently true of nitrogen in aluminum and oxygen, and nitrogen in magnesium. All of these gases form dross films on the melt which greatly slow up the reactions; though at high temperature such reactions proceed rapidly on magnesium.

The value of the equilibrium constant changes with temperature, according to the equation of Van't Hoff, and known as the reaction isochore. The equilibrium constant will decrease with increasing temperature if the reaction is exothermic. If the reaction is endothermic, the equilibrium constant will increase with increasing tempearture and decrease with decreasing temperature. The important fact is that the equilibrium of the reaction products and the reactants will be disturbed by a decrease in temperature and, as a result, Reactions A, B, C, and D proceed to the right.

If the melt solidifies, the concentration of the reactants and reaction products must also change because of their generally decreasing solubility when the melt solidifies. This decreasing solubility, when the melt solidifies, necessarily increases their concentration in the remaining liquid. Under these conditions, the Reactions A, B, C, and D, listed previously, tend to proceed to the right, producing a greater quantity of the reaction products and causing unsoundness in the solidifying metal by Type 2 gas evolution.

Gases in the Solid Metal—The melter of copper-base alloys is primarily concerned with gaseous reactions which occur in the liquid or during solidification and, for this reason, this phase of the problem has been emphasized. Gaseous reactions in the solid metal are of some limited importance. As in the solidifying metal, there are again two analogous types of difficulties which may conceivably arise from gases in the solid metal:

1. Decreasing solubility of gas in the solid metal with decreasing temperature, thereby tending to cause precipitation of the gas which may produce brittleness.
2. Reaction of the precipitated gas with a constituent or impurity in the alloy or with another gas, generally from an outside source, which diffuses into the metal forming a relatively insoluble reaction product.

The steel metallurgist is apparently confronted with both types of these difficulties. Presumably, all metals are subject to these two types of gas evolution in the solid after solidification but, depending upon the nature of the gas-metal system, these various types of gas evolution may or may not be important.

The second type of gaseous reaction in the solid metal occurs in copper containing oxygen, but not in oxygen-free copper. The mechanism apparently has been well established. If the copper is heated, particularly above 750 F in a reducing atmosphere, namely, one containing hydrogen or hydrocarbon, atomic hydrogen is adsorbed on the surface of the copper from which it diffuses into the solid.

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This atomic hydrogen diffuses through the copper and reacts with the Cu_2O located mainly at the grain boundaries. The reaction product, steam, is relatively insoluble and probably does not diffuse out of the solid copper at all, or certainly much less readily than the hydrogen diffuses into it. The result is high pressures produced at the grain boundaries, causing rupture at this location and extreme brittleness of the copper.

If an oxidizable element is in the copper, the maximum possible oxygen content in the copper is greatly decreased and this reaction occurs to a very much less extent. As a result, the copper-base alloys in which relatively low maximum oxygen contents are possible, are not seriously affected by this type of reaction.

The type of unsoundness just described is obviously the result of the content of oxygen in the form of an oxide in the metal. There is no evidence that dissolved hydrogen in the solid metal combines with residual oxygen or with oxygen from an outside source, by Reaction A, to cause the embrittlement of copper or copper alloys.

Although oxygen-free copper, under one atmosphere of hydrogen, dissolves about 6 cc of hydrogen per 100 grams of metal at the liquidus temperature, and also has substantial solubility of hydrogen in the solid copper near the melting point,[31] there is no apparent difficulty which arises from the decreasing solubility of this hydrogen in the solid copper. Thus, this phenomenon, the decreasing solubility of hydrogen in the solid metal, does not seem to be of any great importance in copper or copper-base alloys. Presumably, the hydrogen diffuses out of the copper rapidly enough with decreasing temperature that high gas pressure in voids or other loci of gas precipitation does not occur. Likewise, CO, although claimed by some to have substantial solubility in the solid copper,[31] apparently does not cause any difficulty of this type.

Summary—In general, metals are subject to two types of gas evolution in the liquid, and to two analogous types in the solid. These are as follows:

1. Gas evolution resulting from decreased solubility during solidification.

2. Gas evolution resulting from the reaction of oxygen or an oxide dissolved in the melt with a gas or gas former also dissolved in the melt; this reaction like the preceding one occurs during solidification.

3. Gas precipitation in the solid metal as a result of decreasing solubility with decreasing temperature.

4. Reaction of a gas or a compound containing it with another constituent or impurity in the solid metal, or with a gas, from an outside source, which diffuses into the solid metal.

Of these types of gas evolution, only the first is of importance in aluminum and magnesium alloys, while the second is probably of greatest importance, and the first of less importance in copper-base alloys. In addition, the fourth type can and probably does occur in copper containing the normal amounts of oxygen. On the other hand, all four types may be of importance in ferrous metallurgy. While the same principles undoubtedly apply to all metals, differences in oxygen solubility in the melt, differences of various gas solubility in the solid, and differences in rates of diffusion in the solid, etc., apparently make some of these difficulties unimportant with some metals.

Can Exist Simultaneously

Oxygen exists in the copper-alloy melt simultaneously with various reducing materials, such as hydrogen, tin, zinc, phosphorus, etc. The more strongly reducing the element, and the more of it in the alloy, the lower the possible oxygen content of the melt. The oxygen content fixes the maximum hydrogen content which the melt may contain. This equilibrium of the oxygen with the hydrogen, and with the other possible gases or gas formers, such as carbon or carbon monoxide, is disturbed when the melt solidifies because the concentration of these reactants increases in the unsolidified portion of the melt, causing the Reactions A, B, C, and D to proceed to the right with the evolution of the gaseous reaction product. The small amount of these gases and gas-forming materials required to produce 1 per cent by volume of gas at the solidification temperature has been indicated in Table I.

Deoxidation following the oxidation treatment is necessary in order to produce lower-than-equilibrium oxygen content. If this were not done, the reaction would continue during solidification, resulting in Type 2 gas evolution. In general, the theory of gases in copper-base alloys, as outlined, accounts for many experimental observations and commercial practices dealing with the problem of unsoundness.

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CASTING ZINC ALLOY DIES

(*Continued from page* 79)

Cast iron pots of the above composition should be heat treated to produc an oxidized surface which will still further increase the resistance to solvent action. The inside of the pot is first ground smooth and then it is normalized at 1200 to 1400 F for 4 hr. It is cooled to room temperature in a minimum of 12 or, if possible, 40 hr. To increase protection, pots should be stored outdoors until needed and kept filled with a salt water solution to accelerate rusting.

Just prior to the actual melting of the alloy, the pot is cleaned. Service life can be further increased if a protective coating is applied to the inner surface before beginning melting operations. An iron oxide material for this purpose is available and can be purchased ready mixed or made up in dry form. Twenty pounds of water is mixed with 16 pounds of compound and the resultant solution is brushed or sprayed on after the pot has been heated to about 200 F. Two or three thin coats are preferable to one thick one.

After the pot has been warmed up and coated, a dozen or more ingots are loaded into the pot and the furnace is turned on to full temperature. As soon as the melting starts, additional ingots are added a few at a time until the pot is filled to the desired level. Charging may require from three to four hours, and just before the melting is complete the heat is reduced, either manually or by switching over to the automatic control, so that the temperature of the alloy will not exceed 850 F.

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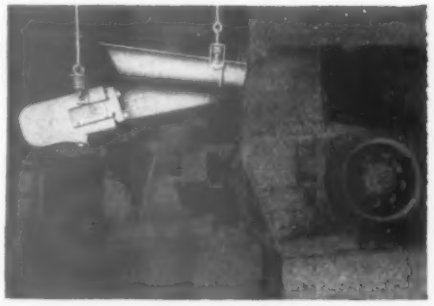

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this process. No attempt should be made to keep the entire melted alloy surface entirely free, as constant skimming exposes new surfaces to oxidation and increases dross losses. Neither should the practice of violently agitating or stirring the metal just before casting be followed, for inclusion of the dross in the casting will result in porosity.

If a thick blanket of dross has been formed, just a part of this is removed before pouring as the pouring lip skimmer will hold back the remainder. When hand ladles are used, the dross is simply pushed aside with the hand ladles or skimmers until the clear alloy is exposed.

Authorities are agreed that the maximum temperature of the metal should not exceed 900 F. Some advocate transfer from the kettle to the mold at this temperature while others place this point at 850 F. The latter has been productive of the best observable results and is therefore recommended. Extensive experience indicates that the alloy should be poured at 825 F. Holding the melt temperatures at, or above, 900 F will cause excessive iron pickup from the kettle, rapid oxidation and dross losses, intergranular corrosion and contamination. This will result in excessive shrinkage, increased warpage and brittleness, shorter pot life and possible spoilage of the melt. On the other hand, holding the alloy between the melting point and 775 F causes segregation of copper-rich compounds which form a heavy sludge at the bottom of the pot and reduce the strength characteristics to the equivalent of pure zinc, again impairing the alloys' usefulness for future operations.

Pouring should be done slowly directly from the ladle into the pouring box or sprue. At the commencement of pouring a gush of metal which might break down the delicate contours of the mold and wash sand into the casting should be avoided. It is recommended that the stream of metal should not be more than ¾-in. in diameter to begin with, for the slower the metal is poured, the sounder will be the casting and the less the distortion due to inequalities in rates of cooling. After the whole bottom of the mold has been covered, the size of the stream poured through the gate may be increased. When two gates are used, metal is poured from two ladles simultaneously and uniformly into the separate gates.

Pouring directly into the die cavity is inadvisable because of the danger of washing some of the sand from the mold face or of splashing the molten alloy, particles of which may adhere to the surfaces of the mold and freeze. If this occurs, the rising level of molten alloy is apt to float these splashes, lifting sand with them and causing bumps on the casting; or to flow around them without remelting. Only when the metal freezes in the gate during a changeover or ladle refill, should the alloy be poured directly into the mold.

As the metal rises in the mold any scum or dross which forms, or which may have passed by the pouring lip skimmer, should be guided away from the side walls of the mold and removed, as adherence to the walls will cause a rough surface. If the ladle holds insufficient metal to fill the entire cavity, hand ladles should be used to keep the sprue filled while the crane ladle is being reloaded, or another ladle is being moved into position. Otherwise, the metal in the pouring box and riser may freeze or partially solidify, interfering with the rest of the operation.

Unless there is an ample supply of molten metal to feed the casting, the forces set up during solidification are sufficient to pull portions of the surface inward, causing draws, or to suck molten metal from a partly solidified heavy section to a liquid lighter one, causing porosity. Several expedients have been developed to overcome or compensate these tendencies.

Make Bottom Sections Thicker

Draw marks are a serious factor, principally in deep drawing dies, and make their appearance generally toward the center of the deepest portion of the dies. This tendency is overcome to a degree by making bottom sections a little thicker than would be necessary from the point of view of strength alone. In addition, the metal above the shallow point is kept in a molten state with a gas torch, until the heavier adjacent section has completely solidified. Then, as the lighter section is allowed to solidify, additional molten alloy is added with a hand ladle and fused into the parent metal as contraction takes place. When an oxyacetylene torch is used, a large tip is fitted and the supply of oxygen reduced to produce a reducing or soft flame.

While the above operations have been described separately, in casting a large die they all may be carried on simultaneously. That is, while the alloy is still being poured from the crane ladle, another operator may be retarding solidification with a torch, and still another may be filling shrinkage depressions from a hand ladle. With experience, this combination of methods will produce a casting with the most uniform internal structure, least porosity and flattest bottom without distortion, warpage, or internal stresses.

During the off-periods between heats, the temperature control on the melting unit should be set, and remain at 800 F until resuming operations, and the molten alloy should not be stirred or agitated in any way for the reasons previously given. It is essential that an even temperature

is maintained by automatic control. When no casting is to be performed over a long period, the Kirksite in the pot should be poured off into pigs.

The length of time a pot should remain in operation before cleaning depends on the frequency of casting. The more often pouring is done, the more likelihood that coatings of the alloy will adhere to the exposed portion of the pot walls. If necessary, pots can be operated continuously for two weeks without injury, if proper temperature control is exercised. It will be found more practicable, however, to shut down at the end of each weekly period, as the time required for cleaning is negligible. Most of the alloy can be peeled off by hand or chipped off with a hammer and chisel. Only in unusual instances will it be found necessary to employ a welding torch to melt down adhering particles or foreign matter.

Obsolete, worn, or broken dies can be used to charge the furnace but should be added to a heel of molten alloy representing between 5 and 10 per cent of the pot capacity. When such dies are melted, care should be taken that all ferrous inserts are removed. Should they accidentally be left on the die and fall to the bottom of the pot, they should be immediately removed with tongs.

Borings May Be Melted

Dies which have been metallized with steel cannot be handled in this way, as the steel particles cannot be removed from the melt. In such cases, the metallized portion of the die should be cut away and scrapped.

Clean borings, turnings, and other scrap likewise may be added to the melt without fluxing, but should be submerged in the melt with a skimmer to avoid oxidation. Care should be taken that no ferrous particles are included in the scrap.

After skimmings, or dross, have been accumulated to the point where there is a sufficient quantity to fill the pot, it is possible to reclaim a fair portion of the alloy by treatment with a flux. A 50-50 mixture of sal ammoniac and zinc chloride (anhydrous) makes a fairly satisfactory flux for the purpose, and will be found most effective in segregating dirt, oxides, and other impurities so that they will float to the top of the melt where they can be skimmed off with the dross.

After the casting has solidified it is ready to be removed from the mold. The casting is lifted by the crane and conveyed a short distance, where it is sprayed or quenched with water to increase its hardness. It is desirable that the spraying be done while the casting is still at a temperature of 400 to 450 F. Accordingly, only a short time should elapse between solidification and this treatment to raise the hardness of the casting 25 to 30 points bhn.

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STEEL CASTINGS: Racine Steel Castings Division, Belle City Malleable Iron Co., Racine, Wis.— Folder 3, part of a series of postwar advertising leaflets, is designed to promote greater cooperation between the design departments of machinery manufacturers and the foundry to secure the best casting for a given part at an economical cost.

VALVES: A. W. Cash Valve Mfg. Corp., 666 East Wabash Ave., Decatur 60, Ill.—Bulletin 199 deals with the company's small volume pressure reducing and regulating valves developed for special installations. Such valves are suitable for drinking fountains, water coolers, spray paint outfits, air lines and similar services using water and air.

MASK: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8—Bulletin BM-15 describes demand type work mask which provides respiratory protection for routine or emergency maintenance or repair work in areas made hazardous by toxic gases or oxygen deficiency.

ELECTRONIC CONTROLS: Wheelco Instruments Co., 847 West Harrison St., Chicago 7—Bulletin 3-6400 explains —with graphs, diagrams and photographs —measuring and control systems, electronic control principle, proportioning, automatic positioning and program control. Also illustrated are: Millivoltmeters, potentiometers, resistance thermometer controllers, indicating pyrometers and resistance thermometers, input controllers, portable pyrometers and potentiometers, and selector switches.

HEAT RESISTANCE: Cerium Metals Corp., 522 Fifth Ave., New York 18—Booklet entitled "The Influence of Minor Elements on the Heat Resistance of Standard Alloys" by W. Hessenbruch, presents this material for the first time in English, having recently been translated from German.

CHAINS: Chain Belt Co., 1600 West Bruce St., Milwaukee 4—Bulletin 46-10 describes and illustrates company's standard chains. Typical installations are illustrated and information is given on standard attachments and cast and cut tooth sprockets.

FURNACES: Hevi Duty Electric Co., 4212 High and Blvd., Milwaukee 1—Bulletin HD-1246 on multiple unit crucible furnaces for temperatures to 1850 F, and heavy duty and square crucible furnaces for temperatures to 2000 F is available.

MANAGEMENT SERVICE: Associated Engineers Inc., 230 East Berry St., Fort Wayne 2, Ind.—Brochure describes the organization's services on problems of engineering and administration which are available to business and industrial organizations. Some of the services offered include: Production planning and materials control, inventory control, work standards and costs, job evaluation and analysis, compensation methods and wage incentives, work simplification and methods, plant layout, quality control and re-operations and waste control.

ARC WELDING: Hobart Trade School Inc., Troy, O.—Pictorial booklet, "Learn Arc Welding," explains the functions and courses of study pursued at the school. Courses offered include arc welding, carbon arc welding, welding of alloy steels and cast iron, helium arc welding, hard facing and tool welding, stud welding and submerged arc welding, spot or resistance welding, metal spray and oxy-acetylene welding and cutting.

CRANE: Silent Hoist Winch & Crane Co., 885 63rd St., Brooklyn 20, N. Y.—Bulletin 68 gives specifications and descriptive data on a modern mobile swing boom crane which is capable of traveling on a railroad or paved or dirt road. It is known as a Rail-O-Road Krane Kar and will pick up a load of 10 tons, transport and position it.

GRINDING WHEELS: Chicago Wheel & Mfg. Co., 1101 West Monroe St., Chicago 7—New quantity pricing schedule for grinding wheels makes it easy to select and order the exact wheels for any job. It is said to incorporate many advantages over the old, cumbersome schedule of discounts.

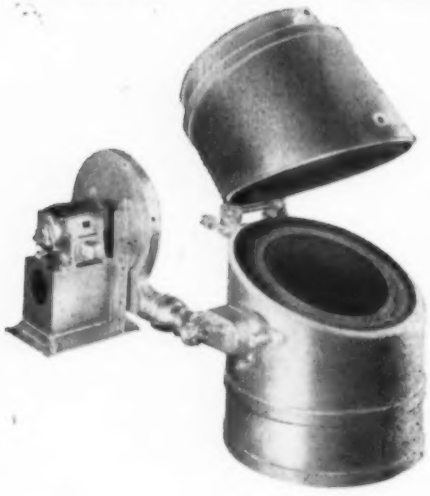
LIFT TRUCK: Truck-Man Inc., Dept. G1, 1436 Ganson St., Jackson 6, Mich. —Folder describes Model D gasoline-powered hydraulic lift truck. It contains complete specifications, dimensioned engineering drawings and construction details. Pictures of operational uses are included.

ROOF MAINTENANCE: Stonhard Co., 403 North Broad St., Philadelphia 8—Folder explains how to stop leaks, renew dried-out roof surfaces, repair flashings and gutters, etc. The application of materials, typical problems and their solutions are illustrated.

MEEHANITE: Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.—News bulletin contains news items about latest developments in the engineering applications of Meehanite castings in industry. This bulletin, No. 24, is the first of a series.

TAMASTONE: Tamms Silica Co., 228 North La Salle St., Chicago 1—Broadside features foundry applications for Tamastone pattern compound for making matchplates, squeezer plates, rollovers, pattern duplicates, cope and drag patterns and coreboxes.

How the ILER furnace cuts your melting costs



The ILER Crucible Draw Furnace cuts Non-Ferrous melting costs because the exclusive Split-Body Design insures faster, easier handling of crucibles. It traps heat in the upper section, reducing reheating time and saving fuel costs. No tongs nor overhead equipment required. No pit needed, furnace rests on floor. Furnace opens and closes at the touch of a handy air lift valve.

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DRAW FURNACES

Clean castings come with the use of Bloomsbury Quality Foundry Facings Make us prove it.

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BLOOMSBURY GRAPHITE COMPANY, BLOOMSBURY, N. J. SINCE 1882

THERE'S MORE TO A BUCKET THAN BITE

The Foundryman considers:

1. Character of materials handled
2. Quantities to be moved per hour
3. Type of hoist or crane available
4. Headroom and space limitations

Then he refers to the Blaw-Knox Bucket Catalogue. With the help of condensed tables of sizes and capacities, detailed descriptions of many types available, and a wealth of pictures and drawings, he is able to pick exactly the bucket that meets his specifications—his ideas of what he needs.

Blaw-Knox builds buckets to meet exacting needs.

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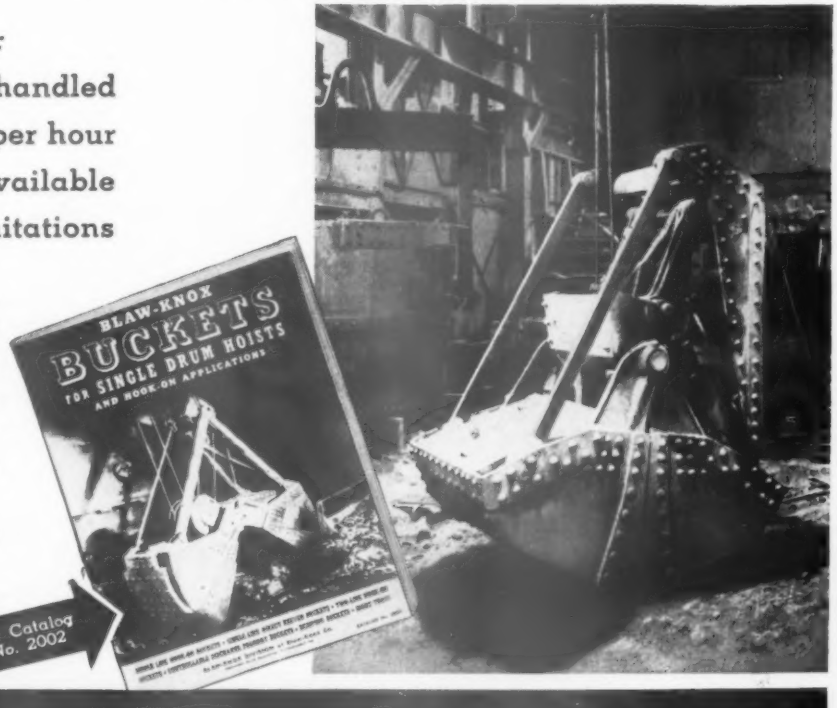

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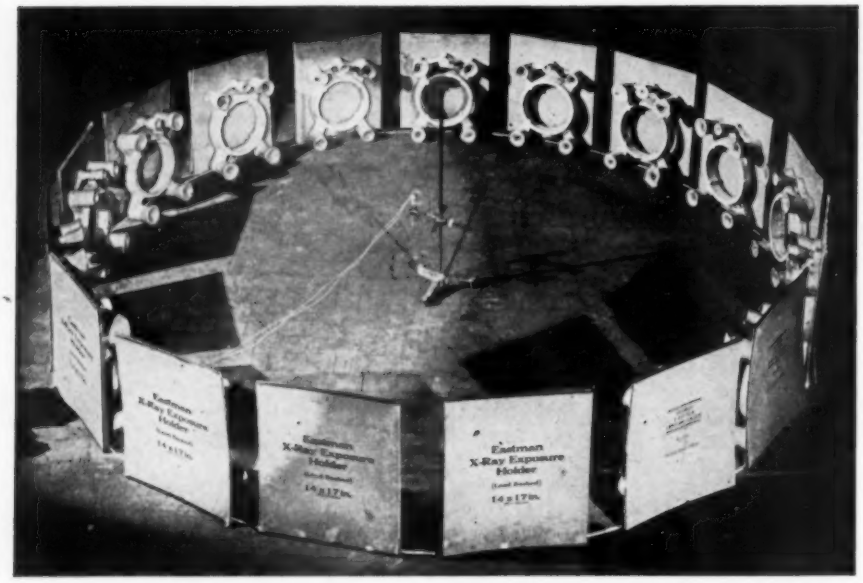

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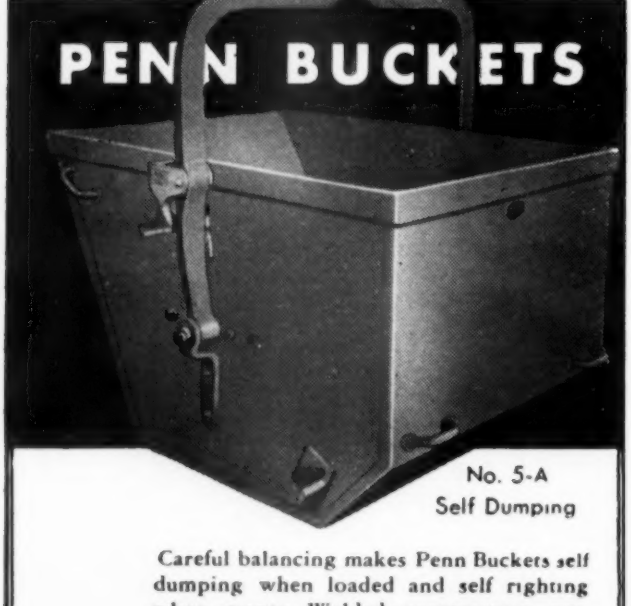

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NO. 4 DAYTON RING VALVE BENCH RAMMER

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Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES. Send for Bulletin No. 300.

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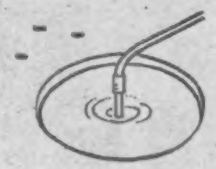
Pour At Correct Temperatures!

Use a Marshall Thermocouple and know the temperature of your molten nonferrous metals at all times! This Thermocouple makes temperature checking quick and easy.

Thermocouple wires are swaged into the hot-junction tip, and are totally enclosed. Wires never come into contact with the molten metal or slag.



Due to its enclosed-tip, Marshall Thermocouples can be immersed in the metal and stirred to hasten reading. The true, below-surface temperature is recorded.

When Marshall Thermocouples are used, needle of the indicator gives a steady, dependable reading that can always be relied upon as accurate.

Send to L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio, for free copy of this descriptive Folder on Marshall Thermocouples, and Replacement Units.

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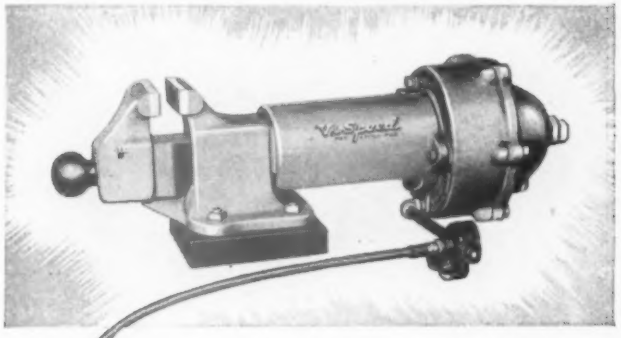
ZERO *to* 3½ TONS AT JAWS



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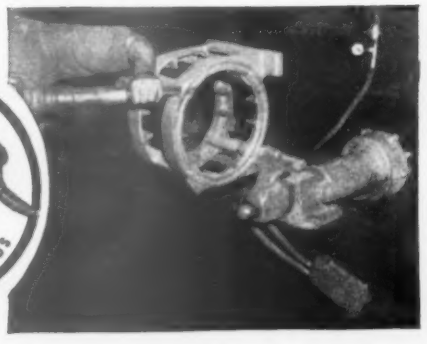

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CASTFLUX IS SOLD ON THIS
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Unless our representations are proven within thirty days after receipt of material, it can be returned at no expense to you.

The "National" Dual Purpose Flux Will Give You a Higher Percentage of Sound, Closer Grained Castings and Fewer Miss Runs at a Low Cost of 6c to 10c per Ton, used at the rate of 1 to 3 pounds per ton of metal treated.

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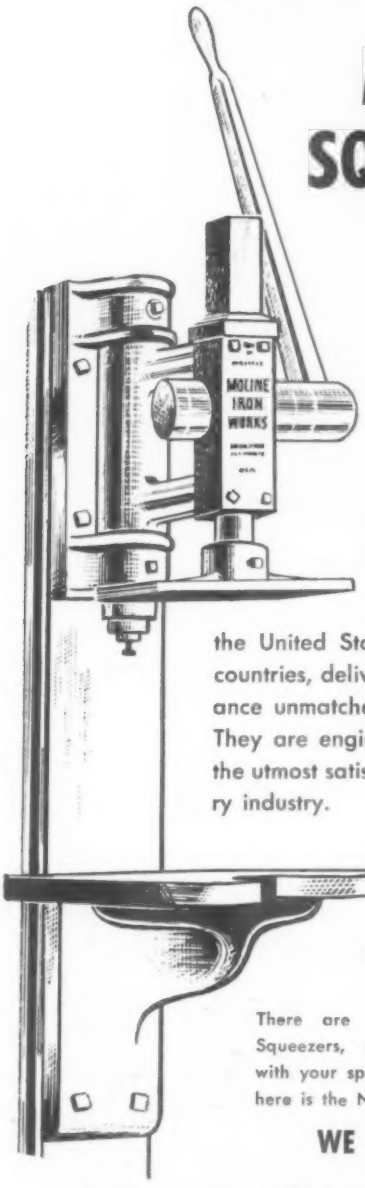
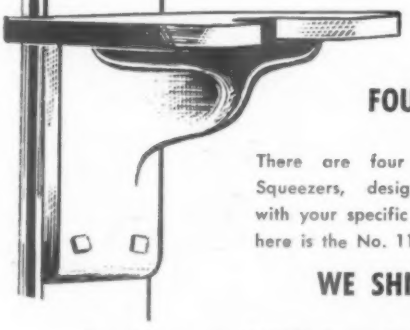


Moline Squeezers have a reputation for getting things done faster and better, and at lower cost. That is why they are being used in all types of foundries from coast to coast in batteries of from half a dozen machines to one hundred and sixty six. They are doing a big job in foundries all over the United States and in nine foreign countries, delivering a level of performance unmatched by similar equipment. They are engineered and built to give the utmost satisfaction to the vast foundry industry.



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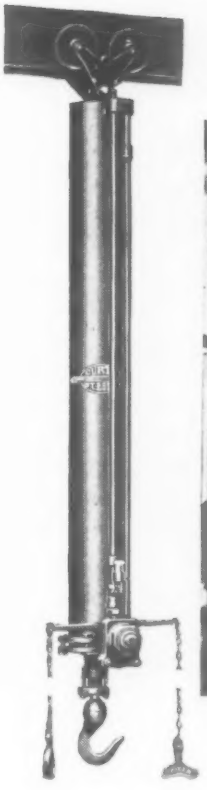

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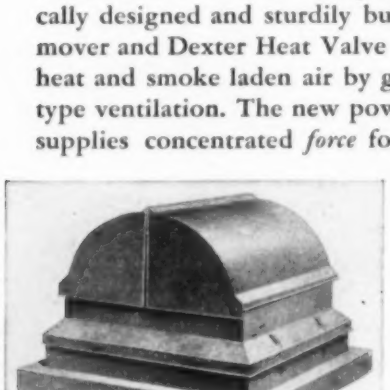

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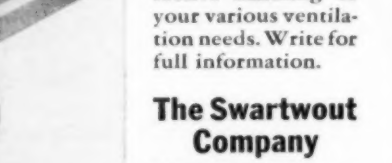

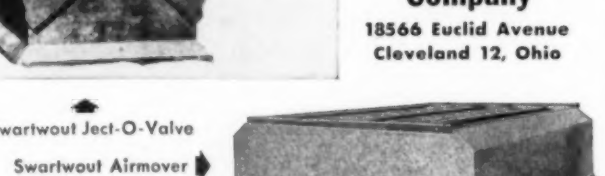

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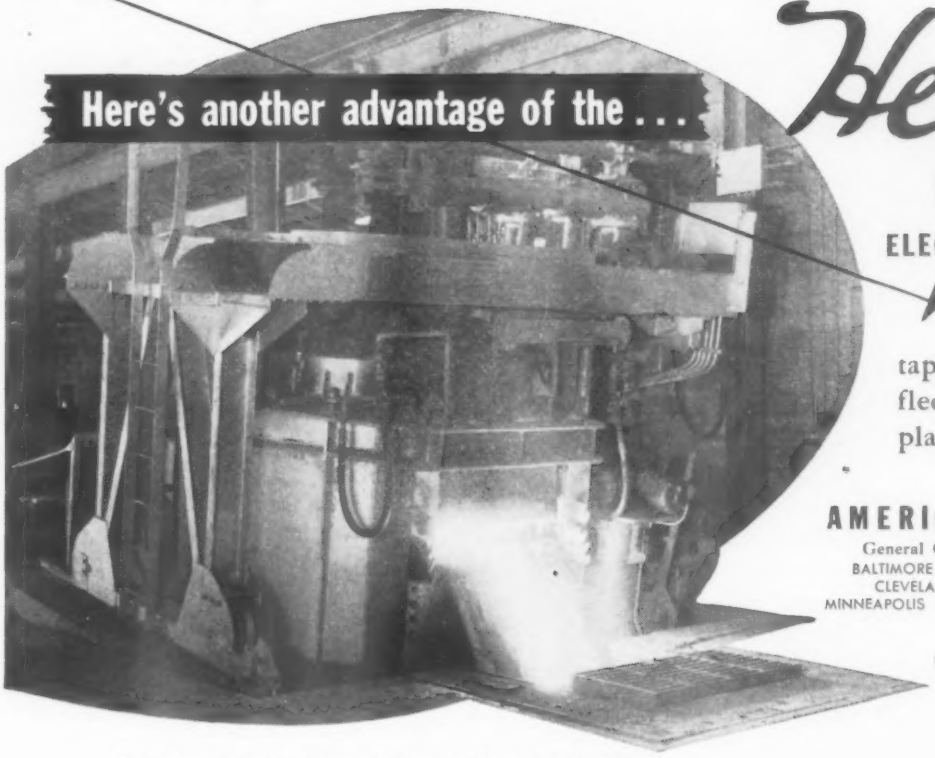

Roof moves over tapping pit, eliminating reflected heat on operating platform.

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High-Grade Grit is thicker, sturdier, tougher. Exceptional abrasive qualities. Its construction gives longer usage. Definitely reduces operating costs.

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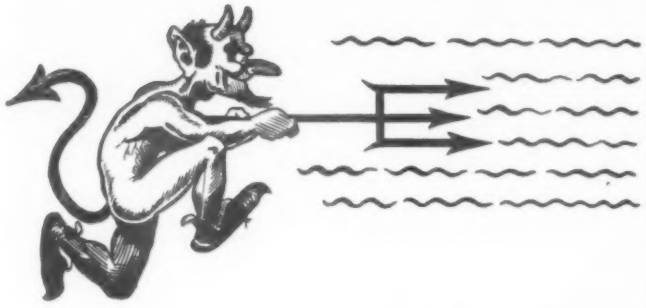
SOFFEL'S FLUXES



For Ferrous and Non-Ferrous Metals

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Modern metallurgical research has definitely proved that the use of fluxes in the production of high-quality castings is no longer a luxury, but has become an economic necessity. In the highly competitive market of today, progressive foundries who are enjoying the greatest volume of sales are those who regularly use SOFFEL'S FLUXES in the production of their castings.

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Through constant study and research into the problems of metal refining, we have scientifically compounded a FLUX for every alloy and melting method. SOFFEL'S FLUXES are designed not only to prevent oxidation of the metal during melting, but also to cleanse and purify the metal through their chemical reactions. Metal which has been refined by the use of SOFFEL'S FLUXES will have more fluidity, less shrinkage, and will produce castings of better color and higher tensile strength. Occluded gases and oxides are removed. Linings of furnaces, ladles, and crucibles will stay clean and last longer. We also manufacture Fluxes for removal of aluminum and iron contamination from brass, bronze, and copper, and for removal of magnesium contamination from aluminum.

For refining aluminum and its alloys, SOFFELITE ALUMINUM FLUXES are unexcelled. They will produce a high degree of fluidity and remove aluminum oxide and iron from the metal. Sound, clean castings can be produced with the use of SOFFELITE which are free from shrink cracks, gas holes, and misruns. Questionable scrap can be refined and cast into quality castings of higher tensile strength. Metal loss in dross skimmings is prevented.

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1352 Marvista St. N. S. Pittsburgh (12), Pa.

How wise foundries REDUCE REJECTIONS

An unjust rejection, based on unsightly surface blemishes—when the casting itself is absolutely sound and strong internally—is a headache you can avert, as do experienced foundrymen all over the country, by using Smooth-On Foundry Cement.

Use it like putty to true up sand holes, blow holes, pock marks, dented contours and other irregularities that are actually harmless, but spoil good looks. You can match color and texture with a surface that will last as long as the casting and even take filing or machining. And at very little expense.

CHOOSE YOUR SHADE

Choose Smooth-On No. 4AA for light gray castings. Has fine grain, high lustre. Machines perfectly. 1-, 10- and 50-lb. sizes.

Choose Smooth-On No. 4A for medium gray castings. Close grain, good lustre, 1-, 5-, 25- and 100-lb. sizes.

Choose Smooth-On No. 4B for dark gray castings. Coarser grain, deeper color. 1-, 5-, 25- and 100-lb. sizes.

TRY IT *FREE*

To any foundry that has not yet used Smooth-On No. 4, we'll send, without charge or obligation, sufficient Smooth-On to make a conclusive test. Check the grade you want to try and mail us the coupon. You'll receive also the famous 40-page, pocket size Smooth-On Repair Handbook, describing the full line of Smooth-On Iron Cements and showing dozens of time-saving, money-saving uses.

— — — — *Sign and Send Now* — — — —

SMOOTH-ON MFG. CO., Dept. 17F

570 Communipaw Ave., Jersey City 4, N. J.
Please send working sample of Smooth-On
No. 4AA ☐ No. 4A ☐ No. 4B ☐
Hardened specimens showing color, texture ☐
Copy of Smooth-On Handbook ☐.

Name.....

Address.....

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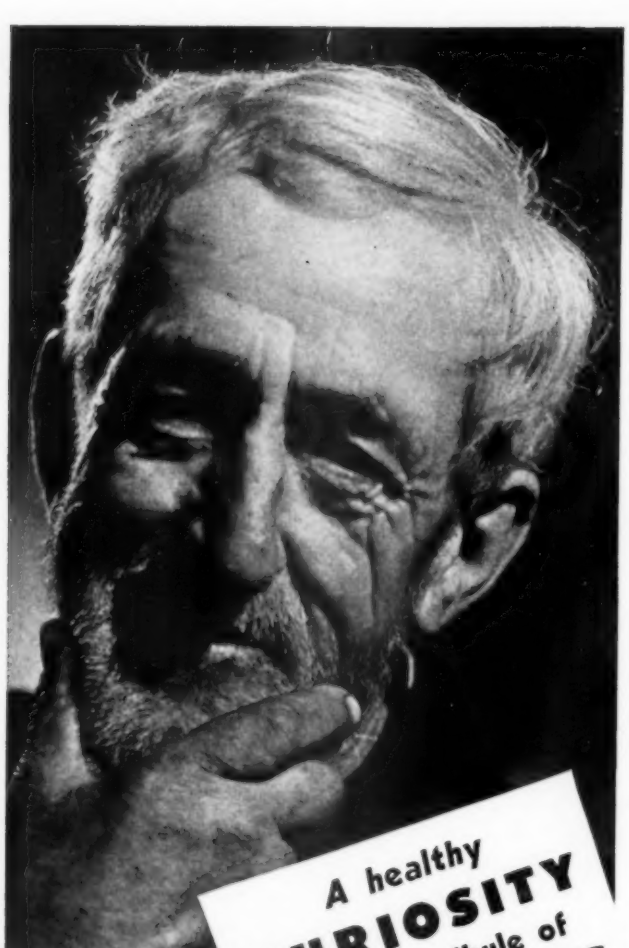
***Do it with* SMOOTH-ON**



Like yourself, I have been reading PENNSY'S ads about CHAPLETS these many years. Was slow in getting around to contacting them because I felt I knew all there was to be known about them. But the FOUNDRY INDUSTRY grew about 20 years in the last 5 years and it is a comforting thing to be able to draw on the KNOW HOW of men who think, eat and live CHAPLETS. My own tip is . . . get in touch with PENNSY when you have a CHAPLET problem and give them a chance to open up and show what they can do for you. I am sorry that I did not get CURIOUS about them years back. Don't you wait that long.

PENNSYLVANIA
CHAPLET COMPANY
Ashland & E. Lewis Street
Philadelphia 24, Pennsylvania

BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
THE PIONEERS OF SILVERY IRON
SPECIAL HIGH SILICON GRADES
YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING of GLOBE
GLOBE IRON CO JACKSON, O.

MODERN BLAST CLEANING AND VENTILATION . .

by: C. A. Reams

■ Mr. Reams, engineer, Ford Motor Co., has compiled this practical book from actual shop experience plus proved engineering information. His discussions of modern methods of blast cleaning and ventilating methods are applicable to all types of metal cleaning by the blast method.

Full information is given on selection of abrasives, abrasive cleaning methods, selection of equipment, abrasive reclamation, advantages and limitations, ventilation and reduction of industrial hazards, and scores of other helpful facts.

Illustrations and diagrams in this 213 page book increase its value to the plant engineer. "Modern Blast Cleaning and Ventilation", $4 postpaid.

Price, $4.00 Postpaid

THE FOUNDRY
Book Dept.
Penton Building Cleveland 13, Ohio

Every Grain is a Complete Cutting Tool!

You get better blast-cleaning results and longer abrasive life when you take advantage of the three big features of CERTIFIED Angular Grit and Samson Shot.

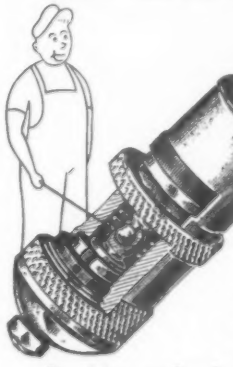
1. Every grain is a complete homogeneous mass — no cleavage lines.
2. Extra hard — due to a special alloy.
3. Hardness further developed by automatically-controlled heat treatment.

All sizes graded to new S.A.E. specifications. Order "CERTIFIED".

Pittsburgh Crushed Steel Co.
PITTSBURGH, PENNA.

Steel Shot and Grit Co.
BOSTON, MASS.

Foundries Save AIR and TIME with Air-O-chek AIR GUNS



Precision made of bar brass and stainless steel.

No Leaks No Levers No Packing

Nothing to get out of order. Years of troublefree performance without attention. That's why leading plants have bought thousands of AIR-O-CHEKS. Install a dozen and compare results with the best you have ever had. Remember AIR-O-CHEKS have the name stamped in the head. Only AIR-O-CHEKS have the ball and socket connecting the enclosed lever to the valve. Sizes for all requirements. Prompt shipment on high priority.

AIR-WAY PUMP & EQUIP. CO., 1050 N. Kilbourn Ave., Chicago 51, Ill.

DOWN THE COSTS UP THE PRODUCTION

These are the goals sought by Conover's completely staffed offices in Cleveland and Detroit

Architects — Engineers — Metallurgists

Specialists in foundry and manufacturing production operations

CONOVER ENGINEERING CO.

O. D. Conover, Consulting Engineer

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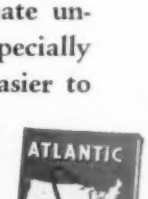
Industrial Bank Bldg. Detroit 26, Michigan CAdillac 8367

ATLANTIC Band Saws

The Favorite Blades of Non-Ferrous Foundries for Over 20 Years

You will profit by using the tougher Atlantic blades for clean, speedy cutting of gates and risers from castings. You can eliminate unnecessary grinding operations—our specially milled tooth construction makes it easier to cut closer to the body of the casting. All Atlantic Metal Cutting Band Saws are guaranteed as to material, workmanship and temper.



Send for Atlantic Band Saw Catalog,
describing foundry cut-off operations.

ATLANTIC SAW MANUFACTURING CO.
Exclusively Band Saw Production

159 BREWERY ST.,
NEW HAVEN 11, CONN.

SAVE "DOWN TIME" AND REPAIRS

OPERATE AIR TOOLS WITH
CLEAN, DRY AIR
USE MURPHY SEPARATORS

The Murphy Type "A" separator is especially recommended on medium sized compressed air installations where air temperature does not exceed room temperature.* It removes **all** moisture, oil and dirt, employing four positive principles of separation. Yet it requires no attention, no maintenance . . . for it is completely automatic and has no moving parts to wear.

Separated moisture drops by gravity to an automatic ejection trap. At no time is condensate and air permitted to make contact. Hence, air is not alone dried, but **delivered dry!**

This unit, when installed as recommended, is **guaranteed** to perform as advertised or money refunded. Write for literature.

* Air will not give up moisture when it exceeds room temperature. In such cases an aftercooler should be employed to reduce temperature. Ask for our aftercooler literature.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.
FIFTH AND VINE STREETS, HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

Safe — Comfortable — Durable!

PULMOSAN No. 64 SANDBLAST HELMET

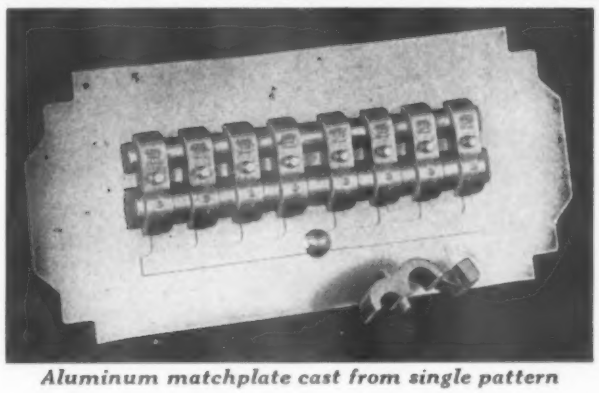
Neoprene Coated
—to hermetically seal all pores, joints, seams.
—to increase durability.

The improved No. 64 Sandblast Helmet weighs only 2½ lbs.; with hose, 3¼ lbs. Weight of helmet is supported on head and shoulders by adjustable inner head-frame. Helmet does not touch head or face at any point. A cool cushion of air is constantly circulated inside helmet. Helmet tailored to shoulders, fastened under armpits with leather straps. Order a No. 64 Helmet and enjoy its low-cost protection.

$15.00 supplied with 6 ft. hose, plus web belt

Choice:
No. 64—W. Window fitted with double wire screen.
No. 64—G. Window fitted with plate glass lens, shielded by single wire screen.

PULMOSAN SAFETY EQUIPMENT CORP.
176 Johnson Street **Brooklyn 1, New York**
1213 Pine St., St. Louis, Mo. *325 W. Clinch Ave., Knoxville, Tenn.*



Aluminum matchplate cast from single pattern

Production with Accuracy

Get more output with safety. That means, with greater accuracy. Foundrymen are thus helping their profit by using our pressure-cast matchplates and cope and drag plates. Single or multiple pattern matchplates cast under pressure in plaster molds—that's the proven answer to today's urgent production needs.

Get our quotations today.

PLASTER PROCESS CASTINGS COMPANY

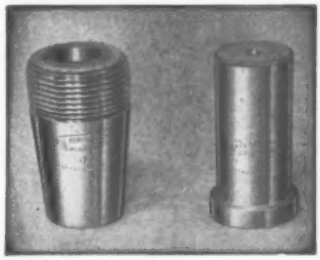
Affiliate of Toledo Matchplate Co.

6922 Carnegie Avenue CLEVELAND 3, OHIO

Pressure-Cast MATCHPLATES

COPE and DRAG PLATES

WHEREVER BLASTING IS DONE!



Wherever there is blast cleaning there ought to be a Federal Blast Nozzle. Made of cast tungsten-carbide (the hardest metal known to man) the Federal Blast Nozzle concentrates the blast, reduces air costs and outwears any nozzle previously offered for the purpose.

Being cast, the tungsten-carbide is pure—as is not the case when made by sintering.

The purity of the metal ensures long wear, reduces air consumption and guarantees concentration of the blast—all due to the extremely slow wear of the orifice.

Made in several sizes adapters can be furnished to fit all makes of blasting equipment.

The Federal Foundry Supply Company

4600 E 71ST ST CLEVELAND 5, OHIO

A Powerhouse for Production

Mall REG. U.S. PAT. OFF.

HEAVY DUTY

Industrial GRINDERS

Put more power and less weight in the hands of your grinding, sanding, polishing and buffing operators by using Mall Flexible Shaft Grinders. These modern flexible shaft machines transfer power from an outside unit to the working tool through flexible shafting. This allows the use of a heavier and more powerful motor, since the operator will not be burdened by the added weight or excess vibration. At the same time, complete portability is maintained by mounting the motor on a caster stand or by hanging it from a caster bail mounting. Also full access to the work being processed is assured through lightweight flexible shafting with lightweight Aluminum Housing.

Available in 3 H.P. Geared Head—4500 r.p.m.; ¾, 1, 1½ H.P. Direct Drive—3450 r.p.m.; and ¾ H.P. Counter-shaft models—1650 to 7400 r.p.m.

Ask your supplier or write for literature on Mall Flexible Shaft Grinders, Mall Drills and Mall Screwdrivers.

FLEXIBLE SHAFT DIVISION

MALL TOOL COMPANY

7720 SOUTH CHICAGO AVE., CHICAGO 19, ILL.

★ *26 Years of "Better Tools For Better Work"*

Mall PORTABLE POWER TOOLS

NERCO
TOWER DRYER

SIMPLE EFFICIENT
LOW COST

The NERCO TOWER DRYER suitable for sand, metal chips and other granular and fine materials. Combines in its simplicity, important factors—as low initial cost, low operating costs and minimum space requirements.

Complete engineering service is at your disposal. Write for particulars.

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ENGINEERING & RESEARCH
CORPORATION
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BASIC, MALLEABLE FOUNDRY, FORGE AND LOW PHOSPHORUS

PIG IRON

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THE E. & G. BROOKE IRON COMPANY

BIRDSBORO, PENNSYLVANIA
Established 1788

THERE'S ROOM ALOFT

If ground is too limited to scatter materials all over the lot, there's room upwards for storage in Neff & Fry super-concrete stave silos. It's better anyway to store flowable bulk materials out of the weather.

The construction of Neff & Fry storage bins assures service for a generation or longer with virtually no upkeep expense. The super-concrete staves are dense, smooth, enduring. They interlock to form strong, tight joints. Each tier is bound with high-tension steel hoops.

Hundreds of N & F bins are in use for storing cement, chemicals, coal, fertilizer, grain, gravel, lime, sand, sawdust, seeds, water, wood pulp, and numerous other materials.

Would you like to have our catalog which tells the whole story? A copy is yours for the asking.

THE
NEFF & FRY
COMPANY
CAMDEN, OHIO

SUPER CONCRETE STAVE

NEFF & FRY STORAGE BINS

This plant was built to SERVE YOU!

MORE THAN 35 years ago The Buckeye Products Company was founded to manufacture foundry facings, supplies and equipment.

The age of our company is not really important. It has been our *unusual* service that has made us famous! For instance—

We developed parting to take the place of imported and expensive lycopodium. Today, Buckeye Tripoli Parting, AVON and CLIFTON Non-Silica Partings enjoy an enviable reputation in foundries all over America.

The introduction of our Buckeye "Three-In-One" Patented Flask guides was a great step forward in foundry procedure and helped eliminate ruined molds.

We also manufacture core oils, dry core compounds, and refractory cements and are handlers of all types of foundry equipment.

We ship by truck or via freight from our own R. R. siding, taking great pride in our promptness. How can we serve *you*?

THE BUCKEYE PRODUCTS COMPANY

7029 VINE STREET, CINCINNATI 16, OHIO

Manufacturers of Core Oil • Parting • Core Compounds • Refractory Cements • Flask Fittings

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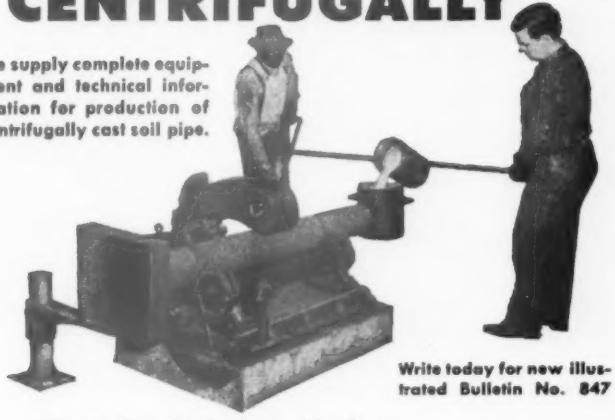
BLYSTONE • MIXERS •

THE paddle-type mixer for core sand mixing in the foundry. Blystone Mixers offer: low mix cost, thorough mixing, and easy operation. There is a sturdily built type and size for your problem. Send for Bulletin and full details.

• BLYSTONE DIVISION •
STANDARD SAND & MACHINE CO.
549 W. Washington Boulevard, Chicago, Illinois

CAST SOIL PIPE CENTRIFUGALLY

We supply complete equipment and technical information for production of centrifugally cast soil pipe.



Write today for new illustrated Bulletin No. 847

This Modern Method Provides for:

- Production Uniformity
- Perfectly Concentric Pipe
- No Sand Blasting or Other Cleaning Necessary
- Use of Unskilled Labor
- Small Man-Hour Labor Cost
- High Production with Low Investment
- Pipe Sizes from 2-inch Diameter Upwards

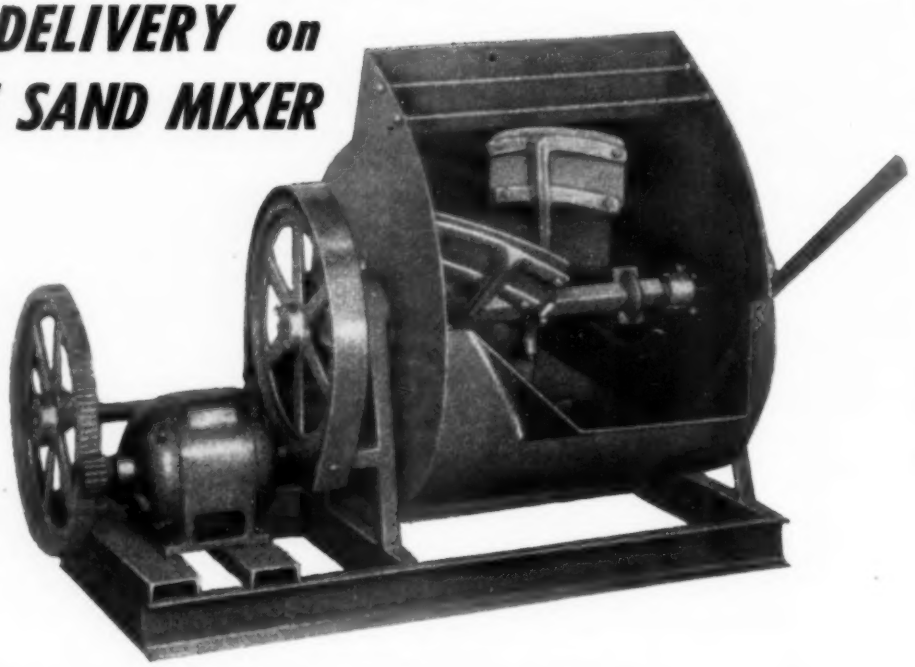
CENTRIFUGAL CASTING MACHINE CO.
P. O. Box 947 *Nathan Janco, Pres.* **Tulsa 1, Okla.**

SOMETHING NEW...

IMMEDIATE DELIVERY on 6 cu. ft. CORE SAND MIXER

$484.00

COMPLETE WITH 3 H.P. MOTOR,
FOB SHIPPING POINT



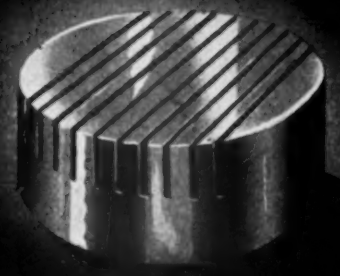
WE WAREHOUSE—

Core Binder
Minco Bond • Bentonite
Albany Sand • Flint Shot
Seacoal • Plumbago
Delta Core and Mold Washes
Core Oil • Parting
Brass and Alum Flux

THE HOFFMAN FOUNDRY SUPPLY CO.

1193 Main Avenue CHerry 4350 Cleveland 13, Ohio

Precision



CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock!

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SPECIFICATION CIRCULAR ON REQUEST

Wm. **DEMMLER** *& Bros.*
Kewanee, Illinois

CLASSIFIED ADS IN

THE FOUNDRY

BRING RESULTS!

- Do you need a superintendent, foreman, metallurgist, electric furnace man, core room foreman, pattern maker, cupola expert?
- Have you some used equipment which should be turned into cash?
- Are you seeking a job?

Address:

CLASSIFIED ADVERTISING SERVICE
THE FOUNDRY
PENTON BUILDING, CLEVELAND, O.

CLEVELAND

MATCH PLATE VIBRATOR

NEW and IMPROVED TYPE "SA"

Here is a vibrator that starts instantly delivering fast, powerful blows. It is the result of more than twenty years of experience and research in our plant and the foundries throughout the country. All working parts are precision made to insure long service with a minimum of wear. Let this practical plate vibrator prove itself in *your* foundry. Delivery available from stock in the following standard sizes:

⅜, ½, ⅝, ¾, ⅞, 1", and 1¼"

CLEVELAND VIBRATOR COMPANY
2828 CLINTON AVE. • CLEVELAND 13, OHIO

Fastest possible dressing action on snagging wheels and other large or coarse wheels calls for Desmond Huntington dressers. Five types of handles and three sizes of cutters meet the full range of requirements. Write for the complete Desmond Catalog No. 45F.

THE DESMOND-STEPHAN MFG. COMPANY • URBANA, OHIO

Desmond

the only complete line of grinding wheel
DRESSERS & CUTTERS

BALL BEARING DRESSERS | REVOLVING CUTTER TYPE DRESSERS | DIAMOND HAND TOOLS AND NIBS | WHEEL TYPE DRESSERS | SIMPLEX STEEL-SLIDE VISES

LESTERGRAM

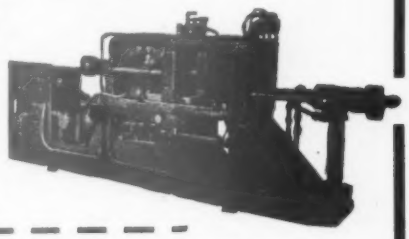
TO FOUNDRYMEN WHO ARE
THINKING ABOUT THE FUTURE
OF THE FOUNDRY INDUSTRY.

There's a LESTER-PHOENIX Die Casting Machine in your Future—if you plan to expand your business...

During 1947, *(?)** non-ferrous foundries will greatly expand their facilities by putting one or more LESTER die casting machines into their plants . . . By doing this, these far-sighted founders will favor their old customers and attract new business because they can—

1. Retain accounts that are considering changing from sand to die casting . . .
2. Quote many jobs on both a sand and die cast basis . . .
3. Add expert red metal knowledge to the development of brass and bronze die casting—which is an almost virgin field.
4. Expand into entirely new fields on account of the tremendous demand for die castings in all metals.

If you are interested in expanding into the die cast field — now or in the future — won't you send for LESTER information? There is no obligation.
*An Unknown number.



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LESTER-PHOENIX, INC.
2659 Church Avenue, Cleveland 13, Ohio

Please send us the following booklets:
Aluminum Die Castings ..... ☐
Brass Die Casting ..... ☐
Lester-Phoenix Catalog ..... ☐

NAME .....
ADDRESS ..... CITY ..... STATE .....

LESTER-PHOENIX
DIE CASTING MACHINES

It's New and Different...a SAND CONDITIONER!

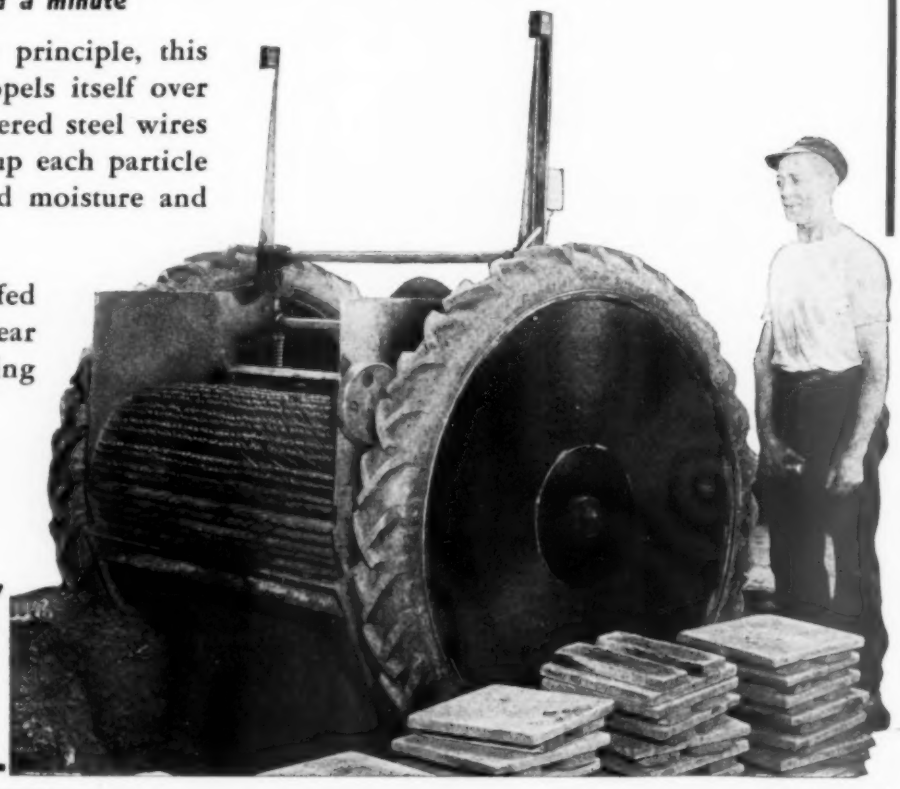
- **The BRUSH does the job—gives a half-ton or more of aerated, fluffed and properly-conditioned sand a minute**

Designed on an entirely new principle, this compact sand conditioner propels itself over the heap as thousands of tempered steel wires revolving at high speed pick up each particle of used sand, added bond and moisture and blend them thoroughly.

The heap is aerated and fluffed as the sand is thrown to the rear by the rotary wire brush, releasing steam and gases.

Write for list of users and further information.

★



"The Moulders' Friend"

SAND CONDITIONING EQUIPMENT

Formerly
(The Purity Moulding Sand Co.)

DALLAS CITY, ILLINOIS

OVER 8,000
Bosworth
MOTO-TRIMMERS
& CONVEYALLS
ARE BEING USED PROFITABLY AND SUCCESSFULLY IN CONVEYING AND LOADING APPLICATIONS!
HANDLES ANYTHING FROM 300 MESH MATERIAL TO LUMP SIZE COAL
A MODEL FOR EVERY CONVEYING PURPOSE
SEND FOR YOUR CATALOG NOW!

Bosworth Products are the "right hand" of progressive industry. Sturdy, speedy and safe, they pay for themselves. Special sizes and lengths can be furnished.

BOSWORTH ENGINEERING CO.

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Dry Ladles in 1/4 the Time

HAUCK VENTURI HIGH PRESS. OIL BURNERS

SAVE HEATING TIME
ELIMINATE SMOKE
HEAT LADLES TO HIGHER TEMPERATURE

Portable, single or double burners set on stands; use compressed air at 40 p. s. i., or low pressure air, for any ladles to 10,000 lbs. capacity. Best construction—best results. Write for new Catalog No. 1043 on ladle heaters, mold dryers, cupola lighters.

HAUCK MANUFACTURING CO.

106 TENTH STREET BROOKLYN 15, N. Y.

THE FRANK L. CROBAUGH COMPANY

METALLURGICAL CHEMISTS

RAPID & ACCURATE ANALYSES

of

Cast Iron Steel Non-Ferrous

and Corrosion-Resisting Alloys

Examination & Photomicrographs

Physical Tests

Blackstone Bldg. Cleveland 13, O.

HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card

1. Pattern Compound

Tamms Silica Co., Foundry Div. — 6-page illustrated broadside No. A-63 features unusual and interesting applications of Super Tamastone pattern compound in foundries. Specifications on Super Tamastone are given and other foundry specialties are described.

2. Snagging Wheels

Simonds Abrasive Co. — 8-page illustrated bulletin form ESA-62-1 describes line of abrasive snagging wheels for foundry and billet grinding. Types of bonds and cutting particles are discussed and recommendations are made for various grinding applications.

3. Mechanical Surface Finishing

Sturgis Products Co. — 6-page illustrated bulletin entitled "Finish Parts Mechanically with Roto Finish" describes grinding, deburring, polishing, Britehoning and coloring operations on stampings, die castings, machine parts, forgings and extrusions.

4. All-Steel Conveyor Belt

Steel Parts Mfg. Co.—8-page illustrated bulletin presents data on all-steel conveyor with metal belt that forms flat work platform. Design features and applications are discussed. Units can be supplied in any width and length required.

5. Pyrometers

Illinois Testing Laboratories, Inc.—16-page illustrated bulletin No. 4361 describes complete line of Alnor pyrometers for measurement of industrial temperatures in wide range of applications. Dimensional data, prices and specifications are given.

6. Hydraulic Lift Truck

Truck-Man, Inc. — 6-page illustrated folder contains specifications, dimensioned engineering drawings, construction details and information on features of model D gasoline-powered hydraulic lift truck.

7. Electric Chain Hoists

Whiting Corp. — 8-page illustrated bulletin No. H-100-A describes line of electric chain hoists. Operation is described and specifications, speeds and prices are given for 1/4, 1/2 and 1-ton hoists.

8. Air Powered Vise

Van Products Co. — 8-page illustrated booklet No. 47-1 presents information on Vi-Speed foot pedal controlled air powered bench vise. Operating on any air pressure from 15 to 150 pounds per square inch, unit has 7-inch jaw opening and maximum jaw pressure 50 times that of air pressure. Equipment includes air pressure gage and regulator, quick release air valve, foot pedal with three-way valve, coupled hose and handle for manual operation.

9. Airless Blast Cleaning

Pangborn Corp. — 20-page illustrated bulletin No. 214 describes in graphic manner principle and construction of Rotoblast equipment, in which centrifugal force drives abrasive particles against work with sufficient force to remove scale and burnt sand. Case studies and typical applications are included.

10. Patterns

Master Pattern Co. — 16-page illustrated buyers' guide with convenient slide-chart index-cover is designed primarily for those not employed in pattern and foundry industry to aid them in selection of pattern equipment. All types of pattern for metals cast in sand and iron molds are covered.

11. Air Filters

American Air Filter Co. — 23-page illustrated booklet form No. 502-A discusses types of industrial dust problems and applications of AAF air filters to such problems. Technical data are presented in relation to air cleaning, dust collecting, machinery cooling, industrial ventilation and other applications.

12. Flooring Material

Walter Maquire Co.—Illustrated bulletin No. 603 entitled "Cut Floor Maintenance" describes Emeri-Crete flooring for industrial plants. Details of "in your plant" test are given for this aggregate which is mixed with cement and water to produce floor for continuous heavy duty service.

13. Abrasive Pebbles

Minnesota Mining & Mfg. Co. — 12-page illustrated booklet entitled "Low-Cost Deburring and Finishing with 'Honite' Abrasive Pebbles" relates how costs of one typical finishing operation on an aluminum die casting were cut 90 per cent. Various types and sizes of Honite are described and tips on how each is best used are given.

14. Wire Cloth & Screen

Cambridge Wire Cloth Co.—32-page stock list No. 600 tabulates data on wire cloth and metallic screen materials which are available for immediate shipment. Data are given on items of steel, galvanized wire, brass, bronze, copper, Everdur, Inconel, Monel, nichrome, nickel and various stainless steel analyses.

FIRST CLASS
PERMIT No. 90
(Sec. 510 P.L.&R.)
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15. Mobile Crane

Unit Crane & Shovel Corp.—12-page illustrated catalog No. 46-B presents information on features, engineering data, applications and working ranges of Unit 357 self-propelled mobile crane. Convertible to all attachments, unit has pneumatic-tired chassis.

16. Industrial Lift Truck

Crescent Truck Co. — 4-page illustrated folder contains specifications and operating data on model LGVH 1000 and 2000-pound capacity Palletier electric industrial lift trucks in both solid and pneumatic-tired models.

17. Flow Meters

Taylor Instrument Cos.—28-page illustrated bulletin No. 98175 presents technical data and information on instruments for flow control, measurement and transmission. Design, construction, characteristics and applications are discussed.

18. Hydraulic Hand Pallet Truck

LYON-Raymond Corp.—2-page illustrated bulletin No. 221 describes lightweight hydraulic hand pallet truck with 2000-pound capacity. Features and specifications are given.

19. General Purpose Filters

Skinner Purifiers, Inc.—4-page illustrated bulletin No. 630 presents data on applications of model 3110-D general purpose filters with cleanable disk type elements. Parts list, flow rate data, exploded illustration of design and construction and specifications are given.

20. Dust Collector

Tubulector Co. — 4-page illustrated bulletin describes Tubulector dust control equipment which can be installed under all industrial conditions for handling of wide variety of dusts. Features of this cloth tube unit, together with specifications and other data are included.

21. Investment Casting

Kerr Dental Mfg. Co. — 20-page illustrated loose-leaf type book describes precision investment casting processes using Kerr equipment and materials. Description and specifications of machines and materials necessary for volume production are given. Advantages of their use are outlined.

22. Industrial Hand Truck

Thermoid Co. — 4-page illustrated folder form No. 3825 presents information about new aluminum industrial hand truck equipped with rubber-tired wheels.

23. Chain Hoists

David Round & Son—4-page illustrated bulletin No. SU-40 describes complete line of Superior spur-geared hoists with capacities from ¼ to 20 tons. Construction features are shown and complete data are given.

24. Heating and Drying Torch

Johnston Mfg. Co. — Illustrated bulletin No. F-809 describes Dri-Flame heating torch. Nonclogging design regulates flow of fuel oil. Uses include skin drying of molds, core patching, etc.

25. Overhead Handling

American Monorail Co. — 56-page illustrated bulletin No. C-1 presents information on complete line of monorail systems, discusses typical installations in wide range of industries and presents features of various types of units. Engineering service is offered.

26. Portable Lubricating Unit

Alemite Div., Stewart-Warner Corp.—4-page illustrated folder form 220-12 describes portable electric or hand operated lubrication department for high pressure lubrication, filling hydraulic systems, servicing oil reservoirs, lubricating gear housings and refilling oil cans and grease guns. Specifications are given for eight models.

27. Industrial Helmet

Mine Safety Appliances Co.—4-page illustrated bulletin No. DK-13 describes Skullgards for protection against all head hazards encountered in industry. Made of high pressure molded laminated Bakelite, helmets are available in various styles.

28. Die Casting Machine

Miller-Taylor Tool Co.—6-page illustrated folder presents data on model No. 30 Cast-Master die casting machine. Machine takes die plates to 36 x 39 inches in size, with maximum die capacity of 34 x 34 inches. Casting capacity is from 1/2-ounce to more than 12 pounds. Complete specifications are given.

29. Magnetic Pulleys

Magnetic Engineering & Mfg. Co.—12-page illustrated catalog No. 146 describes Memco high power magnetic pulleys, presents design and construction data and includes table of standard sizes, dimensional data, weights and capacities of both air-cooled and solid types.

30. Saw Blades

G. W. Griffin Co.—16-page illustrated pocket-size folder and price list covers complete line of hack saw blades and band saws. Suggestions are given on proper selection and use of blades. Tables of tooth and speed recommendations are included.

31. Materials Handling

Brooks Equipment & Mfg. Co. — 2-page illustrated bulletin No. 47-B describes TrucKrane portable crane unit for trucks and Load Lugger hoisting-dumping unit with multiple truck bodies. Specifications, capacities and uses are covered.

32. Dust Collectors

Aget-Detroit Co.—16-page illustrated bulletin No. A-415 presents details of Dustkop dust collectors for ductless dust collecting. Model 1150, 1394-cubic foot per minute unit, is for large machines and model 420, 340-foot per minute unit, is for small machines. Applications and case studies are covered.

33. Precision Lathes

Sheldon Machine Co—Illustrated bulletin No. 1426 describes precision lathes. These machine tools in moderate price range are suitable for use in foundry machine shops and in pattern shops.

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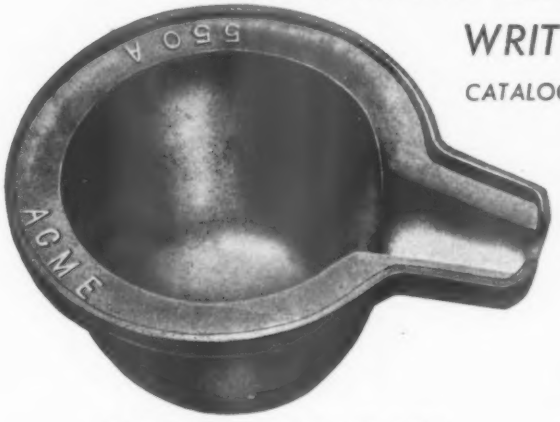

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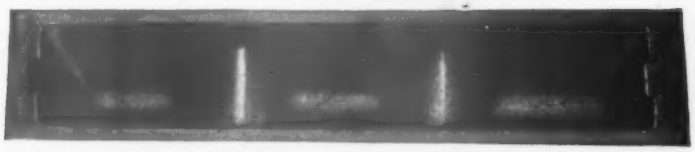

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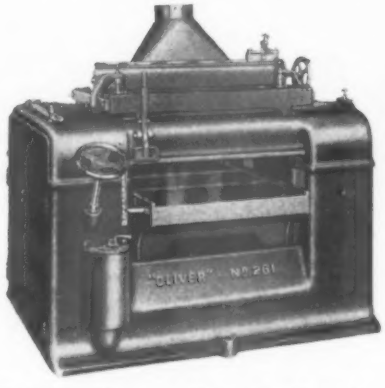

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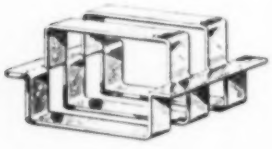

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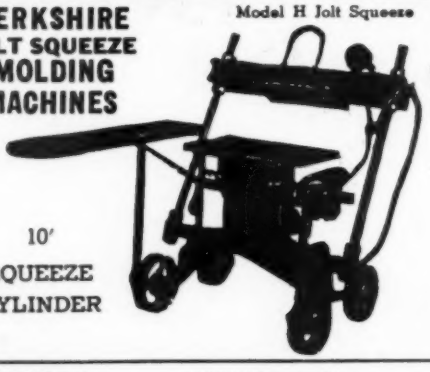

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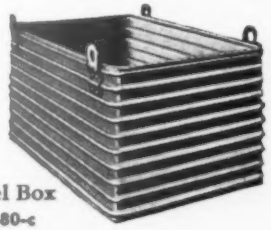

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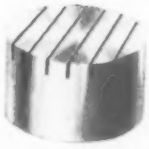

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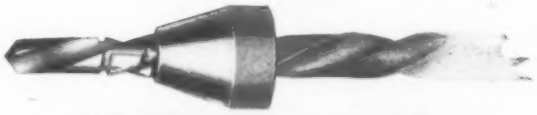

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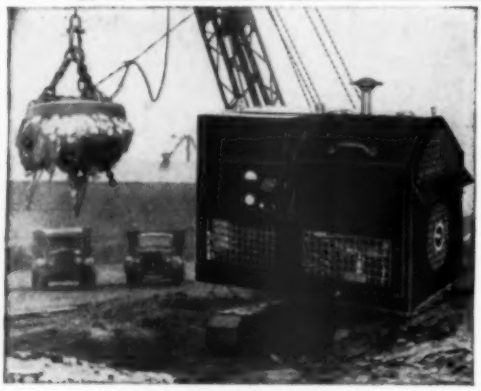

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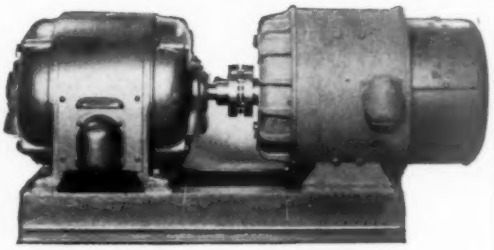

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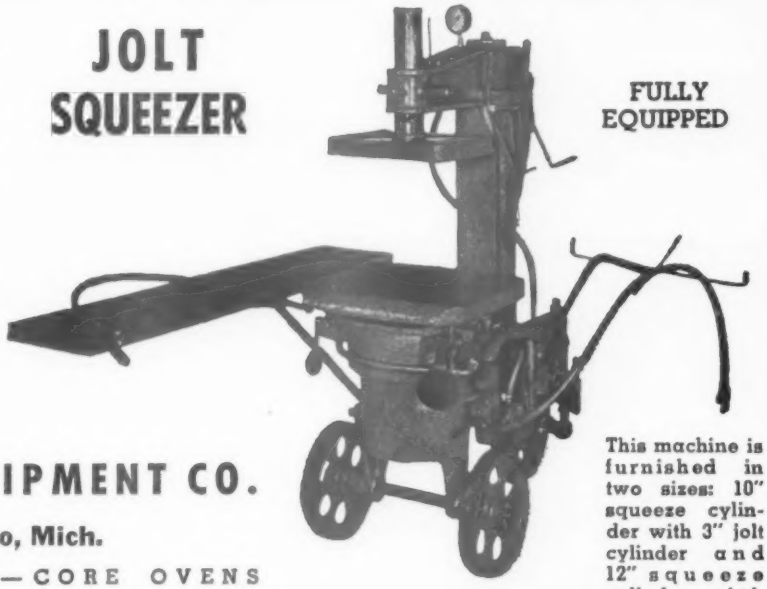

This machine is furnished in two sizes: 10" squeeze cylinder with 3" jolt cylinder and 12" squeeze cylinder with 4" jolt cylinder.

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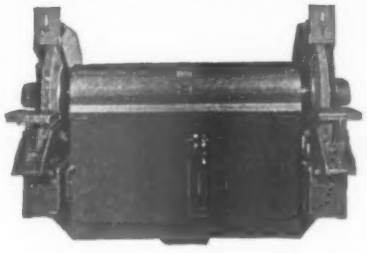

Through automatic control, the Marschke Vari-Speed Grinder assures correct rim speed and accounts for maximum metal removal at minimum abrasive cost.

Constant cutting speed is maintained through a pair of variable speed sheaves linked with the wheel guard adjustment so that spindle speeds are automatically changed when guards are reset to follow the wheel wear. This machine may also be equipped as a Multi-Speed Grinder, thus giving a choice of three speed changes.

Both Marschke Grinders are designed and constructed for years of trouble-free service. They are made for wheel sizes ranging from 20" to 30" diameters and up to 4" widths, driven through multiple strand V belts from 20 HP to 40 HP motors.

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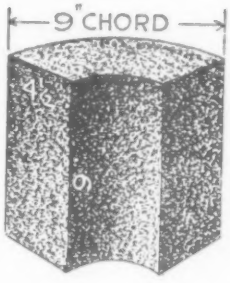

9" Cupola Blocks

Dimensions of all Blocks

Outside Chord . . . . . 9"
Radial Dimension . . . . . 4½"
Height . . . . . 9"

Name of Block	Inside Chord in Inches	Diameter in Inches		Number of Blocks to Circle
		Inside	Outside	
A	5 3/4	16	25	9
B	6 1/4	21	30	11
C	6 3/4	27	36	13
D	6	30	39	14
E	7	40	49	18
F	7	51	60	21
G	7	60	69	24
H	8	73	82	29

Cupola blocks all sizes 9" series and special shape refractories.
Milled fire clay and special cements.

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Norton Co., Worcester 6, Mass.
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Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.
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SAND MIXERS (con'td)

Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.

SAND PREPARATION EQUIPMENT

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Clearfield Machine Co., Clearfield, Pa.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Moulders Friend, Dallas City, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SAND RAMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas
Dayton Pneumatic Tool Co., Dayton 1, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

SAND RECLAIMERS

Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Nichols Engineering & Research Corp., 60 Wall Tower, New York 5, N. Y.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SAND SIFTING and SCREENING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kansas.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.
Pangborn Corp., Hagerstown, Md.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SAND STORAGE BINS & GATES

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, Ohio.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Neff & Fry Co., Camden, O.

SAWS (Band, Metal, Wood)

Atlantic Saw Mfg. Co., New Haven, Conn.
Do All Company, Des Plaines, Ill.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAWS (Cold Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Do All Company, Des Plaines, Ill.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

SAWS (Masonry)

Clipper Mfg. Co., 2800 Warwick St., St. Louis, Mo.

SCALING HAMMERS

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm, Inc., West Chester, Pa.

SCREENS (Shake-Out)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 70 Pine St., New York 5, N. Y.
Screen Equipment Co., Buffalo, N. Y.
Simplicity Engineering Co., Durand, Mich.

SCREW MACHINE PRODUCTS

Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

SEA COAL

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smith Facing & Supply Co., 1857 Carter Rd., Cleveland 13, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.

SEPARATORS (Abrasive)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Air, Moisture, Oil)

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Jas. A. Murphy & Co., Hamilton, O.
Pangborn Corp., Hagerstown, Md.

SEPARATORS (Magnetic)

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Dings Magnetic Mfg. Co., 4740 W. McGeough, Milwaukee 7, Wis.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

SHAKE-OUT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Robins Conveyors, Inc., 70 Pine St., New York 5, N. Y.
Royer Foundry & Machine Co., Kingston, Pa.
Simplicity Engineering Co., Durand, Mich.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Carpenter Brothers, Inc., 608 West Wisconsin, Milwaukee 3, Wis.
Clayton Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10, Michigan.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio
Globe Steel Abrasive Co., Mansfield, O.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
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Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Steel Shot & Grit Co. Inc., 39 Warren Ave., Boston, Mass.

SHOT (Peening)

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
American Steel Abrasives Co., Galion, O.
Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio
Globe Steel Abrasive Co., Mansfield, Ohio.
National Metal Abrasive Co., 3560 Norton Ave., Cleveland 7, O.
Pittsburgh Crushed Steel Co., Pittsburgh 1, Pa.
Steel Shot & Grit Co., Inc., 39 Warren Ave., Boston, Mass.

SHOVELS

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.

SHOVELS (Power)

Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

SILICA FLOUR

Ottawa Silica Co., Ottawa, Ill.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SILICON (Briquets)

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SILICON CARBIDE (Briquets)

Carborundum Co., Perth Amboy, N. J.

SILVERY PIG IRON see Pig Iron (Silvery)

SKIMMER BARS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

SKIMMERS

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

SKIP HOISTS

Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

SLIP FLASKS

Adams Co., Dubuque, Iowa.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

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Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
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Niagara Falls Smelting & Refining Corp., 2204 Elmwood Ave., Buffalo 17, N. Y.

SNAGGING WHEELS—See ABRASIVE WHEELS

SNAP FLASKS

Adams Co., Dubuque, Iowa.
Diamond Clamp & Flask Co., Richmond, Ind.
Hines Flask Co., 1324 Hird Ave., Cleveland 7, O.

SODA ASH

Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17, N. Y.

SOLDER

American Smelting & Refining Co., 120 Broadway, New York 5.

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Dravo Corporation, Neville Island, Pittsburgh 25, Pa.

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Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

SPIEGELEISEN

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

SPRAY GUNS

Murphy & Co., Jas. A., Hamilton, O.
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Bethlehem Steel Co., Bethlehem, Pa.

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Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
International Molding Machine Co., 2608 W. 16th St., Chicago 8, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

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TAPER PINS
Standard Horse Nail Corp., New Brighton, Pa.

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Illinois Testing Laboratories, 418 N. LaSalle St., Chicago 10, Ill.
Marshall Co., L. H., 270 W. Lane Columbus 1, O.

TESTING EQUIPMENT
Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

TESTING LABORATORIES
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.

TESTING MACHINES (Tensile)
Detroit Testing Machine Co., 19390 Grinnell Ave., Detroit 13, Mich.

THERMOCOUPLES
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Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

TIERING MACHINES (Power)
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TIMERS (Electric)
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

TIN
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

TONGS
Industrial Equipment Co., Minster, O.

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Severance Tool Industries Inc., Saginaw, Mich.

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Chicago Pneumatic Tool Co., General Offices: 8 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas
Dayton Pneumatic Tool Co., Dayton 1, O.
Gardner-Denver Co., Gardner Drive, Quincy, Ill.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Schramm Inc., West Chester, Pa.

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Freeman Supply Co., Toledo 5, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.

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Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRAMRAIL SYSTEMS
American MonoRail Co., 13104 Athens Ave., Cleveland 7, O.
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Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

TRAMRAIL SYSTEMS (Cont'd.)
Modern Equipment Co., Port Washington, Wis.

TROLLEYS
Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.
Modern Equipment Co., Port Washington, Wis.

TRUCK BATTERIES (Industrial)
Electric Storage Battery Co., Allegheny Ave. at 19th St., Philadelphia 3, Pa.

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Hughes-Keenan Co., Mansfield, Ohio

TRUCKS (Dump)
Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3, Pa.

TRUCKS (Industrial)
Buda Company, Harvey, Ill.

TRUCKS (Power Lift)
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.

TRUCK WHEELS
Bethlehem Steel Co., Bethlehem, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

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Pressed Steel Co., Wilkes-Barre, Pa.

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Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES
Beardsley & Piper Co., The 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Newaygo Engineering Co., Newaygo, Mich.
Roto-Cast Foundry Equipment Inc., 100 Grand St., Coldwater, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNIT HEATERS
Dravo Corp., Neville Island, Pittsburgh 25, Pa.

UNLOADERS (Portable-Gas, Electric)
Bosworth Engineering Co., 6723 Denison Ave., Cleveland, Ohio.

VALVES (Air, Water, Steam)
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, O.
R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, Pa.

VALVES (Adjustable Orifice)
North American Mfg. Co., 4455 E. 71st St., Cleveland 4, Ohio.

VALVES (Blow-off and Cut-off)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Wm. H. Nichols Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

VENTILATORS (Roof)
Swartwout Co., 18511 Euclid Ave., Cleveland 15, Ohio.

VENTS (Core Box)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS
Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, Ohio.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

VISES (Air Operated)
Van Products Co., Erie, Pa.

WARM AIR HEATERS
Dravo Corp., Neville Island, Pittsburgh 25, Pa.

WASH ROOM EQUIPMENT
Bradley Washfountain Co., Box 732, Milwaukee 1, Wis. Milwaukee, Wis.

WAX (Core, Vent, Pattern)
PMS Co., 1701 Power Ave., Cleveland 14, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)
National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.

WHEELBARROWS
Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)
Bay State Abrasive Products Co., Westboro, Mass.
Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keystone Abrasive Wheel Co., Carnegie, Pa.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

WOOD FLOUR
Ace Foundry Materials Co., 14611 Fenkell Ave., Detroit 27, Mich.

WOODWORKING MACHINERY
Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT
Allis Chalmers Mfg. Co., Milwaukee 1, Wis.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.

ZINC
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

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Help Wanted

GRADUATE ENGINEER

Not over 45 as assistant to general works manager of a group of foundries. Business, labor relations training and experience as relating to foundry operation are of paramount importance in addition to a sound recognition of foundry production technique. A satisfactory performance as assistant will lead to the works manager position. Please reply, giving complete training and performance data to DAVID G. ANDERSON, NATIONAL FOUNDERS ASSOCIATION, 120 SOUTH LASALLE ST., CHICAGO 3, ILLINOIS.

FOREMAN

For Pour-off and Shake-out

Capable of handling crew of 20 to 25 men for pour-off and shake-out in grey iron foundry making 15 to 20 tons small and medium castings. Crane and hand ladles used. All round foundry experience desired, but not absolutely essential if otherwise intelligent and able to handle men. This is a good opportunity for the right man, 30 to 40 years of age preferred.

Write giving experience, age, approximate salary expected and other particulars.

BOX 383

THE FOUNDRY CLEVELAND 13, OHIO

MAINTENANCE ENGINEER

Experienced in the design, installation and maintenance of foundry equipment, including sand and casting conveyors. Large Southern plant. Excellent opportunity for experienced man. Address: Box 260, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Midwest smelter of nonferrous metals needs foreman with metallurgical background. Man selected must have experience on reverberatory type furnaces. Excellent opportunity for advancement. Give all details in first letter. Address: Box 423, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For grey iron and nonferrous metals. Must be capable of assuming complete charge of operations. Age 35 to 45 preferred. Salary plus percentage of profits. Address: Box 413, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Grey iron and semi-steel foundry now being mechanized desires to employ metallurgist to handle cupola and sand controls and such other work as is customary. Prefer young man with some experience in mechanized foundry. Permanent position. South-Central Pennsylvania location. Address: Box 403, The FOUNDRY, Cleveland 13, Ohio.

ASSISTANT FOREMAN

In a modern equipped mechanized brass foundry. Good opportunity. Must have thorough knowledge of foundry and oil furnace practice. State age, experience and salary expected. Address: Box 274, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY
PRODUCTION FOREMAN

Permanent position, good salary for competent, experienced foundryman with large, expanding gray iron foundry. Give complete background in letter. Address: Box 416, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURER'S REPRESENTATIVES WANTED

Jolt squeezer production foundry producing light grey iron castings, located in Western Pennsylvania, desires to set up manufacturers agents throughout the East and Middle West. Can make immediate deliveries. Address: Box 409, The FOUNDRY, Cleveland 13, Ohio.

MANUFACTURER'S AGENT

To sell gray iron and alloy iron castings, open territory. 5% commission, immediate shipment. Address: Box 407, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Fully experienced in nonferrous metals, cores and pattern work on light pressure-tight castings. Give full information regarding yourself, salary expected and references.

BOX 335

THE FOUNDRY CLEVELAND 13, OHIO

Help Wanted

FOREMAN

Malleable foundry, Cleveland. Practical man to take charge of section of foundry and supervise thirty squeezer and rollover molders. Must be able to handle men. Salary commensurate with ability. State age and qualifications.

BOX 410

THE FOUNDRY CLEVELAND 13, OHIO

COREMAKER

Gray iron foundry making small sand medium sized castings requires core room foreman preferably with valve castings experience. Give full experience, references and salary in first letter.

BOX 271

THE FOUNDRY CLEVELAND 13, OHIO

ASSISTANT FOREMAN

For old established gray iron foundry pouring 15 to 20 tons. Principal production from squeezers and rollover machines. State age, experience and salary expected. Address: Box 372, The FOUNDRY, Cleveland 13, Ohio.

EXPERIENCED CUPOLA FOREMAN

For new Southern Ohio mechanized grey iron foundry with mechanical charging of 96" cupolas for continuous pouring. ADDRESS: G. W. VANDERVORT COMPANY, BOX 580, PORTSMOUTH, OHIO.

MOLDERS WANTED

Experienced gray iron molders. Light and medium casting. Air machines. Steady work located in Iowa. Address: Box 404, The FOUNDRY, Cleveland 13, Ohio.

WANTED

(1) Core room foreman, young with practical experience and some technical training.
(1) Assistant to foundry superintendent with experience in squeezer and other machine molding in grey iron jobbing foundry. Address: Box 432, The FOUNDRY, Cleveland 13, Ohio.

SALES ENGINEER

Required by established manufacturer of pneumatic tools. Prefer man with established non-competitive allied lines. Exclusive territory-commission oasis. Address: MASTER PNEUMATIC TOOL COMPANY, INC., 2100 KEITH BLDG., CLEVELAND, OHIO.

ASSISTANT TO PRESIDENT

To take over operating details of foundry making iron and steel castings, a technical graduate—married—in the thirties. Must have actual operating experience in both iron and steel. Address: Box 385, The FOUNDRY, Cleveland 13, Ohio.

SAND ENGINEER

Want man who is thoroughly experienced in synthetic sand control for excellent job in sand service work. Must travel. Could now be engineer, metallurgist or superintendent. Should have good personality but no selling required. Address: Box 430, The FOUNDRY, Cleveland 13, Ohio.

CORE SAND
TROUBLE SHOOTER

Large gray iron foundry wants experienced foundryman, thoroughly familiar in analyzing core sand problems. Extensive practical background essential. Permanent position. Salary open. Address: Box 415, The FOUNDRY, Cleveland 13, Ohio.

ELECTRIC STEEL FURNACE OPERATOR

Ohio foundry needs well experienced operator for 1½ ton acid electric furnaces. Night and day shifts. Hourly rate. Steady work. Address: Box 429, The FOUNDRY.

Help Wanted

FOUNDRY SUPERINTENDENT

Unusual opportunity in Cincinnati area for one capable of operating a production conveyorized, grey iron foundry, melting approximately 60 tons per day. Prefer college graduate with metallurgical or engineering training plus practical experience in molding, core making and cupola operation. Successful applicant will be given a complete psychological screening test for ascertaining his highest potential. Salary commensurate with ability and has no limitations. We are not an employment agency but are merely handling preliminary negotiations for our client.

UNITED INDUSTRIAL SERVICES
308 EDWARDS BLDG.
CINCINNATI, (2) OHIO

HIGH GRADE MECHANICAL ENGINEER

Outstanding technical group engaged in development of radically unconventional, highly advanced foundry technology employing new approaches to dimensional and metallurgical precision in one pound to 50 pound castings, can use high-grade mechanical engineer with permanent mold and machine design experience, familiar with foundry processes but definitely not a "foundryman." Address: Box 379, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

LONG ESTABLISHED EASTERN FOUNDRY HAS OPENING FOR MAN EXPERIENCED IN OPERATING AIR FURNACE MELTING OF MALLEABLE IRON. DUPLEXING EXPERIENCE PREFERRED BUT NOT NECESSARY. WRITE FULL RESUME OF EDUCATION, EXPERIENCE, REFERENCES AND SALARY EXPECTED. ADDRESS: BOX 395, THE FOUNDRY, CLEVELAND 13, OHIO.

GRAY IRON SUPERINTENDENT

Practical foundryman. Must be thoroughly skilled in rigging jobs and training men in 75 man jobbing plant. Ability to handle men is vital. Must know costs, figure from blue prints and bid on work. Splendid opening for able, experienced man. Substantial company. Write in fullest detail about background, health, age, qualifications. Strictest confidence observed. Chicago area. Address: Box 424, The FOUNDRY, Cleveland 13, Ohio.

CORE ROOM FOREMAN

Must be top-notch executive, able to handle 400 men. No amateurs. Address: Box 425, The FOUNDRY, Cleveland 13, Ohio.

TIME-STUDY AND RATE SETTER

By foundry in Eastern Pennsylvania. Must have had previous foundry experience. Address: Box 422, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

STEEL FOUNDRY MANAGER
OR
SUPERINTENDENT

Twenty-two years supervisory experience producing carbon, low alloy and high alloy steel castings, starting as molding foreman through to works manager. College degrees in engineering and metallurgy, but primarily a practical foundryman with complete knowledge of all phases of production, modern foundry techniques, laboratory control, heading and gating, furnace operation, molding, heat treatment, cleaning and finishing, maintenance, plant layout, and labor relations. Have increased efficiency, trained men, cut scrap and costs, administered incentive and bonus plans and improved safety record. Capable of assuming complete charge of plant operations. Address: Box 364, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
GRAY IRON, NONFERROUS METALS

Practical foundryman with many years experience in gray iron, semi-steel and nonferrous metals. Light, medium and heavy castings such as copper, aluminum, red brass, yellow brass, manganese bronze and aluminum bronze. Experienced in jobbing semi-production and mechanized foundry set up. Understand patternshop, molding, coreroom, grinding, cleaning and shipping room. Age 40, married. Employed as foundry superintendent. Desire change. Address: Box 312, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN
SUPPLIES, EQUIPMENT

Specializing binders 16 years. Mature years. Nation wide experience. Salary and expenses. Address: Box 390, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

CORE DEPARTMENT SUPERVISOR

Can set up and operate efficiently a production core department. Handle men and women coremakers on bench, rollover and blower machines. Good labor relations record. Twenty years' practical and supervisory foundry experience. Thirty-six years of age. Address: Box 414, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

With approved record in successfully managing and building up foundry, machine and allied industries available shortly for position requiring dependable qualifications and service. Ability to efficiently direct all office, sales, financial and creative activities and produce consistent profits unquestionably established by previous record. Address: Box 304, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical experience in the production of heavy to light machinery castings, dry, green sand and loam. Production work on jolt squeeze, rollover and continuous pouring. Technically trained, specializing in sand control, cupola operation and the production of high tensile iron for pressure castings. Excellent results with labor relations. Married, available at once. Very much interested in middle west and Chicago area. Will go any place. Address: Box 402, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY EXECUTIVE

YOUNG GRAY IRON FOUNDRY EXECUTIVE WISHES TO LOCATE IN OR NEAR ARIZONA FOR REASONS OF FAMILY HEALTH. SEVERAL YEARS' BACKGROUND OF PROVEN ABILITY TO MANAGE IRON FOUNDRY. NOW TOP EXECUTIVE OF GOING BUSINESS. INTERESTED IN POSITION WITH OR WITHOUT INVESTMENT.

BOX 406
THE FOUNDRY CLEVELAND 13, OHIO

PATTERNMAKER FOREMAN

General pattern shop experience wood or metal patterns any size. Estimate cost from drawings, layout work, make or supervise and set patterns and castings. First class mechanic can make wood or metal rush jobs in shop. Foundry experience core blowing, driers and gates. Address: Box 418, The FOUNDRY, Cleveland 13, Ohio.

STEEL FINISHING FOREMAN

Experienced in all phases from mold to delivery up to 500 ton per month at less than .005 per lb. Now employed. Prefer Eastern United States. Address: Box 401, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN

Twenty years' foundry experience in aluminum, brass, manganese bronze, magnesium and grey iron on bench, floor jolt squeezer, rollover and slinger work. Supervisor of gating and rigging, milling and sand. References from past employers. Address: Box 393, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC

Master mechanic and maintenance head of foundry. Thirteen years' experience. Reliable references gladly furnished. Address: Box 427, The FOUNDRY, Cleveland 13, Ohio.

DO YOU want to increase your production and reduce your foundry cost? You can, through mechanization, plant layout, wage incentive, methods improvement, production control, cost control and sand control at a very reasonable cost. Address: Box 361, The FOUNDRY, Cleveland 13, Ohio.

TIME STUDY ENGINEER

Desires position with a well established malleable or gray iron foundry. Thorough knowledge of foundry practice. Capable of improving methods and initiating new incentives in various departments. Address: Box 349, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

AVAILABLE AT ONCE

Foundry foreman, superintendent or master mechanic. Thirty-two years' experience, twenty-eight in supervisory capacity. Experienced in all lines foundry, coremaking, pattern making. Fourteen years in Latin America, one year in the Orient. Best of references. Address: Box 377, The FOUNDRY, Cleveland 13, Ohio.

PATTERNSHOP SUPERINTENDENT

Desires change. Capable of taking complete charge of shop to insure good work at reasonable costs. Jobbing or production. Estimate from prints, wood or metal. Thorough knowledge of foundry practice in steel, grey iron and nonferrous metals. Address: Box 359, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS FOUNDRYMAN

Want position as superintendent or general foreman in full charge. Practical nonferrous foundryman, technically trained. Broad working knowledge of all activities in production and jobbing foundries. Good rigger and can handle men. Address: Box 346, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Qualified grey iron foundryman, 18 years practical and technical experience in production and jobbing foundries making castings 1 lb. to 20 tons. 36 years of age and a good producer. Address: Box 320, The FOUNDRY, Cleveland 13, Ohio.

Correspondence Course

GOOD FOUNDRYMEN ARE NOT AN ACCIDENT—THEY DO NOT MERELY HAPPEN

Foundrymen who will add the concisely arranged information on mixing, melting, and semi-steel to their store of experience will prove a valuable asset to any firm. Even though you know 90% of what we offer, the remaining 10% may be causing your firm large losses. Our report on your melting may be worth the fee alone. Remember, semi-steel is the purest, hottest and strongest metal made in the cupola. Synopsis free.

MCLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE 12, WIS.

Open Capacity

OPEN CAPACITY

Brass foundry and production machine shop. Automatic machinery. Core blowing equipment for higher production and hydro-blast barrel for cleaner castings. No small production runs accepted.

AK SAR BEN BRASS MANUFACTURING CO.
4520 S. 36th STREET OMAHA, NEBRASKA

OPEN CAPACITY

New foundry at Hoagland, Ind. in Ft. Wayne area has open capacity to make light aluminum castings. Contact: Hoagland Foundry, Inc., Hoagland, Ind.

CASTINGS

Grey Iron
10 to 300 lbs.

FISHER & NORRIS
TRENTON, N. J.

GRAY IRON CAPACITY

Ohio foundry can accept production runs for small castings under 30 lbs. Can also do machining if desired. Address: Box 388, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

OPEN CAPACITY

In New England foundries for most sizes and types of gray iron castings. Mail specifications and inquiries to: Box 338, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON CASTINGS

We have open capacity for production runs on squeezer and cope and drag work. Address: Box [illegible], The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Squeezer, jobbing, rollover work in grey iron castings. Quality and prompt service assured. Prefer squeezer assignments from mid-west section near our Kansas plant. Address: Box 339, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Open capacity in grey iron foundry. Bench, bumper and floor work. Address: Box 321, Belleville, Illinois.

BRASS AND ALUMINUM CASTINGS

Northern Michigan foundry has open capacity for jobbing and production work. Reasonable prices and good castings. Can also make your patterns. Address: Box 411, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

Gray iron production foundry located in East Tennessee has open capacity for squeezer work. Can furnish up to ten tons per day. Address: Box 397, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY FOR GRAY IRON

We have open capacity for grey iron castings and desire a contract to manufacture items from matchplate patterns or larger castings up to 500 lbs. from precision made patterns. Address: CORNISH AND WARD FOUNDRY CO., NASHVILLE, ARKANSAS.

Foundries for Sale

PRODUCTION FOUNDRY FOR SALE

15,000 sq. ft—5 acres—steel and cement block bldg. 8 jolt squeezers—4 jolt rollovers—2 strippers—Pangborn rotoblast—12 ft. table, 42 in. Whiting cupola (capacity 15 to 20 tons per day)—2 core ovens—large assortment of snap flasks. On main highway 30 miles North of Detroit. A going business. Will sell control or 100%.

MR. D. VINCENT
WARDELL SHERATON HOTEL
DETROIT, MICHIGAN

FOUNDRY FOR SALE

Aluminum permanent mold foundry, producing building specialties; national distribution. $200,000 a year business. Owner must sell at once, no reasonable offer will be refused. Address: FLORIDA DIE CASTING FOUNDRY, P.O. BOX 1589, ORLANDO, FLA., PHONE 2-1838.

GRAY IRON FOUNDRY

in Denver, Colorado for sale, including business and real estate. Good trackage. Doing about $100,000 a year business mostly with Railroads. Orders for 2 years' work on hand. Capacity about 40 tons a day. Price, including 2 cupolas, 2 cranes, freight elevator, etc., $100,000.

T. C. HITCHINGS & SON
810-14TH STREET
DENVER, COLORADO

FOR SALE

Aluminum foundry in the metropolitan area of New Jersey, doing approximately $6000 business per month, at present employing 8 men. Cement block building, plot 65 x 90, equipment and business complete $18,000. Address: Box 400, The FOUNDRY, Cleveland 13, Ohio.

PRODUCTION AND JOBBING FOUNDRY

70,000 square feet, for manufacturing gray iron, brass and aluminum castings. Daily capacity 20 tons gray iron, 5 tons nonferrous metal. 60" cupola, jolt squeezers, strippers, rollovers, bumpers, 2 core ovens, large assortment flasks. Going business. Pittsburgh district. Address: Box 382, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Foundries for Sale

FOUNDRY FOR SALE

Buffalo, N. Y. Cement and steel construction, 12,000 sq. ft., 4 acres of land, RR siding, 32" cupola, large core oven, 2 tumblers, new sand blast room, 9 jolt squeezer machines. Present production 4 tons daily. Price complete $150,000.00, terms. Wire, write or call MR. FULLER, HUNT-REALTORS, 410 BRISBANE BLDG., BUFFALO, N. Y. WA 5943.

FOUNDRY FOR SALE

Small gray iron foundry located in Iowa. Fully mechanized. Capacity for 10 to 12 tons daily. Has excellent rail facilities. Main building 100 x 160' and others in fine shape. Complete molding machinery, new American Wheelabrator, sand conditioning equipment, flasks, etc. Fully equipped core room. Bay conveyor. Address: Box 399, The FOUNDRY, Cleveland 13, Ohio.

WEST COAST STEEL FOUNDRY FOR SALE

Going steel foundry well situated, with good market. Production capacity 200 tons per month of carbon and low alloy steels. Foundry now operating with good equipment and full personnel. Address: Box 277, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Well equipped brass and aluminum foundry now operating 4500 sq. ft floor space. Selling on account of ill health. Address: DOERR BRASS FOUNDRY, 725 N. DELPHOS ST., KOKOMO, INDIANA.

FOR SALE
OR
SALE OF CONTROL

Small electric furnace foundry, 75 tons per month capacity. Located Western Pennsylvania. Address: Box 408, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Modern nonferrous foundry located in Southern California, Los Angeles area trackage. Other business connections forces owner to sell. Excellent opportunity. 3500 lb. capacity job. Address: Box 337, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS
$2,500-$25,000

This thoroughly organized confidential service of 37 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, DEPT. T, 109 CHURCH STREET, NEW HAVEN, CONN.

Wanted-To-Buy

WANTED TO BUY

9' or 11' tractor type sandslinger. Advise serial number and price. Address: Box 302, The FOUNDRY, Cleveland 13, Ohio.

WANTED

1 42" or 48" square tumbling mill
1 48" x 72" round tumbling mill
1 24" x 54" round tumbling mill
1 30" x 60" round tumbling mill

State price and condition.

THE MAJESTIC COMPANY
HUNTINGTON, INDIANA

WANTED

Grey iron foundry with capacity of 50 to 60 tons per day located in Middle west. Ohio or Indiana preferred. Address: Box 405, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

LABORATORY MIXER WANTED

Small sand mullor (laboratory size) wanted. Might consider small mulbaro-type unit. Address: Box 332, The FOUNDRY, Cleveland 13, Ohio.

WANTED TO PURCHASE

Completely or the majority interest in a grey iron foundry equipped with molding machine for light production work in Eastern Pennsylvania, New Jersey, New York or Connecticut. Must be reasonably priced. Address: Box 426, The FOUNDRY, Cleveland 13, Ohio.

WANTED

New or used tapping machine for tapping plumbing fittings from 1" to 4" with two or three tapping heads. Pottstown machine preferred. Address: Box 396, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Olsen tensile testing machine 60,000# capacity. When writing give full details as to price, etc. Address: Box 386, The FOUNDRY, Cleveland 13, Ohio.

WANTED TO BUY

Electric steel foundry on West Coast or Southwest. Capacity, approximately 200 tons per month. Address: Box 384, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Grey iron foundry with modern sand handling equipment. Daily capacity 20 to 35 tons. Address: Box 352, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Type AA sand cutter, gas driven, cutting blades 52" wide, outside width of wheels 74". Address: Box 232, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Modern sand handling equipment. Address: Box 353, The FOUNDRY, Cleveland 13, Ohio.

WANTED

2—Roots-Connersville Blowers #4 in good condition.
1—Cupola #4. Give make, age and condition.
1—Band saw Metal Production.
3—275 J Osborne Jolt Squeeze Molding Machine, or equivalent.
3—275 P.J. Osborne Jolt Squeeze Molding Machine, or equivalent.
3—210 P.J. Osborne Jolt Squeeze Molding Machine, or equivalent.
1—#242W or #243W Osborne Jolt Rockover and pattern draw or equivalent.
1—27" x 36" American Wheelabrator with motors and loading skip, or equivalent.
1—#558 or #559 Jolt Stripper, or equivalent.

BOX 317
THE FOUNDRY CLEVELAND 13, OHIO

TRANSFORMER WANTED

Furnace type, single phase. 13200 volt primary. 110 volt secondary. 200 KVA to 300 KVA. Address: Box 433, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Dust tight mixer for dry metallic powders—capacity approximately three tons per hour. Preferably with enclosed drive. Address: Box 329, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
10—75J Osborn Portable Jolt Squeeze, Strain Rod Type.
1—International Portable Hand Jolt, Hand Rollover, Foot Draw, Core Machine.
2—Tabor Plain Squeeze, Strain Rod Type.
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table.

BLOWERS FOR CUPOLAS AND FURNACES
6—#805 General Blowers, 5 H.P., 3/60/220, 1400 C.F.M. at 8-oz. pressure.
1—North American 10 H.P., 3/60/220-440, 1300 C.F.M. at 16-oz. pressure.
1—North American 7½ H.P., 3/60/220-440, 1050 C.F.M. at 16-oz. pressure.
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
2—#600 Hausfeld Single Burner Tilting Crucible Furnaces, Oil Fired. #150 to #175 Crucible Size.
1—#675 Hausfeld Single Burner Tilting Crucible Furnace, Oil Fired. #250 to #275 Crucible Size.
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired.
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired.
1—Aluminum Electric Heat Treating Unit, 75 KW, 220 Volt, Batch Type, with Basket and Quench Tank.
2—Hausfeld Open Flame Tilting Brass Furnaces, 400# capacity, Gas or Oil.
4—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers.
2—Monarch-Rockwell Rotating, 500# Brass. Oil.
New 32" to 41" Dia. Shell Cupolas made to order.

TUMBLING MILLS AND SAND BLAST
2—(New) Baird No. 3-D Oblique Tumbling Mills, 27" Dia. 30" deep, direct motor drive, with motor driven tilting mechanism. Load capacity approx. 400 lbs.
4—New Haven 36" x 46" Self Contained Sand Blast Barrels, Belt Drive.
2—Pangborn Syphon Feed Sand Blast Cabinets.
3—Portable Sand Blast Generator Tanks, 500# Sand Cap.

MISCELLANEOUS
1—Heavy Duty Back Geared Sprue Cutter, 1½" square knives, T & L pulley drive.
1—No. 1 Blystone Sand Mixer, 7 cu. ft., 5 H.P. 3/60/220-440, motor connected.
1—Shuster Wire Straightener and Cut-Off Machine. Belt Drive.
1—Wadsworth Core Machine.
2—2000# Cap. Worm Geared Ladles, V-Bail.
1—2500# Cap. Worm Geared Ladle, V-Bail.
1—4000# Cap. Worm Geared Ladle, V-Bail.
1—Cloth Screen Dust Collector.
6—Worm Geared Tilting Ingot Mold Stands, 6' to 12' long.
1—Small Motor Driven Tumbling Mill.
1—Curtis Twin-Cylinder 15 H.P. 3/60/220 Air Compressor, with radiator and fan for self-cooling
1—No. 105 Schramm 4-Cylinder Air Compressor, 25 H.P. Size.
1—Core Oven 7' x 6' x 7' re-circulating hot air, truck rack type.
1—Gas Fired Hill & Griffith Semi-Circular Core Oven.
7—Hydro-Whirl, Wet Type, Dust Collecting Booths, suitable for Magnesium, Aluminum, Brass, etc. 5' x 3' working table and collecting system built as complete unit.
2—Hydro-Whirl, Wet Type, Collectors for double end grinders.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST.
CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

One (1) Despatch drawer type gas fired core oven, five (5) 42" x 48" drawers 8" high. Used one week. Price $2300.00, f.o.b. St. Paul. Contact:

FOUNDRY SUPPLY COMPANY, INC.

2295 UNIVERSITY AVE., ST. PAUL 4, MINN.

Classified Advertising

For Sale

(6) Furnaces, box type, electric, Hoskins type FP-252, 220V, 26 KW.
(6) Furnaces, melting, pot type Fisher mod. B. Furnace, heat treat—elec. "Elec. Furnace Co. 300 KW complete.
Furnace, preheat continuous "Industrial Circ-Air" gas fired, 30" W. x 12' L. including blower (less motor, burner and controls).
Furnace, preheating oven type "American" #1 gas fired 8" W. x 10" H. x 14" L. I. D.
Furnace, heat treat, salt bath elec. "Upton" tank size 80" L. x 44½" W. x 36½" H. including transformer 240 V to 18.4V.
Furnace, preheating, "Industrial" gas fired 46½" x 70" x 50" H. including 4 burners.
Furnace, preheating, "Industrial", gas fired 43½" W. x 39½" D. x 37½" H. (less burners & door).
Furnace, melting—200# capacity "Hausfeld" Mag-St, gas fired stationary type, including burner.
(4) Furnaces, melting—1200# capacity "Hausfeld" Mag-Tilt, gas fired including burner, less lining.
Core machine, Osborn #602.
2 Core Machines, hand rollover, Osborn #42.
Aerator (sand blender) "Jeffrey" #1-30 to 70 ton per hour capacity with steel supports, V belt drive & 7½ HP motor.
Screen, revolving, Palmer Bee, 4' dia. x 9' H. drum including #HD8 speed reducer.
Sand blast cabinet, Sly 8' W. x 8' L. ¼ x 7' 3# H. complete with 6" turntables, motors, exhaust, and controls.
Conveyor, distributing belt type, elevated, Palmer Bee, 182" I., 24" W.—5 ply, 120 FPM including 10 hoppers 18" x 30", 6 hoppers 16" x 18", overflow chute, belt wiper, 170' steel walkway, 5 HP motor and #HD8 speed reducer.
Chip extractor, DeLaval with 3 HP motor.
Sand blast room, "Pangborn" mod. MT-S with 2' 6" x 6' 6" door, complete with floor hopper, bucket type elevator, conveyor, abrasive separator, roto-active table, blast cleaning hose, dust collector, 10 HP, 3 HP and ¾ HP motor and controls.
Also have available machinery for drilling, tapping, milling, grinding, turning, broaching, and sawing, plus one lot of Transite Core Plates in sizes 8 x 8 x ¼ to 30 x 30 x 1.

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BLDG.
DETROIT, MICH.

FOR SALE

ALL EQUIPMENT REBUILT & GUARANTEED IN STOCK

OVERHEAD ELECTRIC TRAVELING CRANES

	TONS	MAKE	SPAN	CURRENT
(2)	1½	Shepard	18'0"	230-VDC.
(2)	3	Case	52'0"	115-VDC.
(1)	5	Northern	14'0"	230-VDC.
(1)	5	Northern	23'11"	440-VAC.
(1)	5	Shaw	30'0"	220-VDC.
(1)	25/5	Niles	80'0"	230-VDC.

ELECTRIC MONORAIL HOISTS

(1)—½-ton American Lo-Hed, 230-VDC.
(6)—½-ton Shepards, 230-VDC., 5-HP. motor HIGH SPEED, FL. OP., 30'0" lift.
(1)—1-ton Shepard, 230-VDC., FL. OP.
SPECIAL: 7½-ton, 2-motor, cage operated, Shepard, 230-VDC., 40'0" lift, enclosed for outdoor service, hoist 28/70-FPM., Trolley 400-FPM., an excellent hoist for scrap yard service or cupola charging.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.

SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKES & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

1—Osborn plain squeezer No. #75, side arms 36" apart.
1—Arcade plain squeezer No. #578, side arms 32" apart.
1—Tabor, 22 x 30" jolt, ram, power rollover, power draw, with air clamps.
2 conveyor sections, U shaped, 20' long, 24" wide, 2½" rollers and 4" centers.
The above items have all been overhauled in the past 60 days.

BOX 434
THE FOUNDRY CLEVELAND 13, OHIO

For Sale

FOR SALE

6—Int. Type R.J. power jolt hand R.O. & foot draw Flasks—14" wide—8" draw
4—Int. Type R.J. power jolt hand R.O. & foot draw Flasks—20" wide—8" draw
1—Tabor Hand Rollover—20" x 8"
10—International, Type E.M.C., Special—20 x 62 x 5"
8—International, Type E.M.C., Special—14 x 30 x 5"

Core Grinder
1—Milwaukee Type #70—Price $1,750.00 ea.

1—Demmler #3 Core Blower, practically new—$850.00

1—Royer, N D.P. Sand Separator—2 H.P., 3/60/220 Motor
1—New Belt for N.D.P. Machine
Registered as an Approved Dealer by War Assets Administration. Send us your inquiries.

SCULLY MACHINERY & EQUIPMENT CO. NOT INC.
767 MILWAUKEE AVE.
CHICAGO 22, ILL. PHONE: MONROE 8918

FOR SALE
SWING TYPE
SANDSLINGER

Beardsley & Piper, serial S.T. 481, 19" head, 4" tip, 20 h.p., 1200 R.P.M. motor in perfect condition.

5-TON ROTARY PLATE FEEDER

Beardsley & Piper, serial F. 110 with motor-reducer & starter, steel frame, hopper for discharging to swingslinger. Perfect condition.

MOLDING MACHINE

#918-B Johnston & Jennings, table 44" x 54", 20" draw, 2,000 lb capacity at 80 lb air pressure. Cost new approximately $3500. Sales Price $1200.

NATIONAL FOUNDRY CO. OF N. Y., INC.
10 SANDFORD ST. BROOKLYN 5, N. Y.

FOR SALE

ALL NEW AND UNUSED EQUIPMENT

All Electrical Equipment for 440 V., 60 Cycle, 3 Phase unless otherwise specified.
1 New WHITING "U" TYPE 18" BOTTOM RADIUS x 64" MIXING LADLE
1 New NO. 3 AMERICAN WHEELABRATOR multi-table, 4-48" diameter auxiliary tables, plus list of repair parts.
1 New NO. 56 SLY DUST FILTER, type EE 360, 10 ft. long, with fan house on R.H. 8 ft. long. Structural supporting frame 10 ft. high. Complete with motor and fan 11,816 C.F.M.
1 New COLEMAN OIL FIRED CORE OVEN—Vertical lift type door. Inside dimension width 6 ft. 6 in., height clear 6 ft. 6 in. length 8 ft. Three new core racks and one Yale and Towne multi-stroke hydraulic lift truck—5,000 lb. capacity.
1 New 5 H.P. DELCO MOTOR—low starting current-type, ball bearing, 3 ph. 60 cycle, 220/440 Volt, 900 R.P.M. Reversible frame 324 slide base.

THE LENNOX FURNACE CO.
1711 OLENTANGY RIVER ROAD,
COLUMBUS, OHIO
PHONE WALNUT 4611
CONTACT W. C. ATWATER

FOR SALE

(1) New PG-100-S Foundry Equipment Company Portable Mold Drier Gas Filled, Capacity One Million BTU, Complete With Safety And Control Equipment With Special Frame For Crane Handling.

(1) Used Type 2 Model JLA, 12 Ton Plymouth Gear Drive Gasoline Locomotive For Standard Gauge Track And With Full Size Couplers Front And Rear. Good Condition.

COOPER-BESSEMER CORPORATION
PURCHASING DEPARTMENT,
MOUNT VERNON, OHIO

For Sale

EQUIPMENT FOR SALE

1—	Osborn #93 Core Blower	$1100.00
4—	Osborn Plain Squeezers	125.00 ea.
1—	#276 P. J. Osborn Jolt Squeezer	500.00
1—	#210 P. J. Osborn Jolt Squeezer	400.00
2—	Osborn #601 Jolt Roll-overs	650.00 ea.
2—	Royer Portable Sand Blending Machines 440 V., 3 phase, 60 cycle motor	200.00 ea.
4—	International 20 x 8 Draw Type R-Hand Ram, Hand draw, hand roll-over machines	125.00 ea.
1—	North American Turbo Blower 2000 cu. ft. m., 32 oz., 30 H.P., 3500 R.P.M., 440 V., 3 phase, 60 cycle A.C.	650.00
4—	Lowe Electric Gyratory Riddles 440 V., 3 phase, 60 cycle	70.00 ea.
1—	General Electric Turbo Blower 1950 cu. ft. m., 32 oz., 27½ H.P., 3500 R.P.M., 440 V., 3 phase, 60 cycle A. C.	750.00
1—	Spencer Turbo Blower 1300 C.F.M., 32 oz., 25 H.P., 1750 R.P.M., 440 V., 3 phase, 60 cycle, A.C.	700.00
1—	Exhaust Fan for sand or cleaning system 40 H.P., 3 phase, 60 cycle, 440 V., A.C.	525.00
1—	Electrolift Hoist ¾ ton 220 V., D.C.	150.00
1—	Electrolift Hoist ¼ ton 220 V., D.C.	100.00
1—	Star Electric Hoist ½ ton 220 V., D.C.	125.00
1—	Link Belt Portable Belt Conveyor 26 ft. long 18" belt with all weather 440 V., 3 phase, 60 cycle motor	500.00
1—	Roth Brothers Motor Generator Set, D.C., 15 H.P., 230 V., 1800 R.P.M. Shunt Wound. A.C., 220-440 V., 3 phase, about 25 H.P.	650.00
1—	Westinghouse Motor Generator Set, D.C., 62.5 H.P., 230 V., 1200 R.P.M., Shunt Wound. A.C., 220 V., 3 phase, about 75 H.P.	1200.00
1—	U. S. Electric Tool Grinder double spindle polishing lathe 3 H.P., 440 V., 3 phase, 60 cycle	200.00
1—	Westinghouse Motor 30 H.P., 220-440 V., 3 phase, 60 cycle, 3500 R.P.M.	275.00
1—	U. S. Electric Tool Co., Polishing Lathe 2 H.P., 440 V., 3 phase, 60 cycle	150.00
1—	Gardner Polishing Lathe 3 D. 5 H.P., 440 Volt 3 phase, 60 cycle	500.00
1—	Marschke Grinder 440 V., 3 H P., 1800 R.P.M., 3 phase, 60 cycle	200.00

MARCH-BROWNBACK CO., INC.
POTTSTOWN, PA.

TURBO BLOWERS

(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP. 220/440 V., 3 ph. 60 cycle 3600 RPM

PRESSURE BLOWERS

2100 cfm @ 10 oz. Spencer with 10 HP, 3/60 3400 RPM motor
1400 cfm @ 8 oz., Robinson with 5 HP, 3ph, 60 cy. 3600 RPM motor
1100 cfm @ 16 oz. Sturtevant 8 x 8, 24" dia. wheel
800 cfm @ 24 oz. Amer. Blower with 10 HP, 220/440 volt, 3 ph. 60 cy. 3600 RPM
500 cfm @ 14½ oz. McKee 6 x 6 with 5 HP, 3600 RPM
250 cfm @ 12 oz. North American with 2 HP, 3/60 3450 RPM motor

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

HYDRAULIC PUMPS

Aldrich Pump Co. Vertical Triplex HYDRAULIC PUMPS, 2¾" x 8", equipped with Herringbone Gears. 67.5 gpm. Maximum pressure for intermittent duty 2,200 lbs. for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate.

Motors are 75 HP, 3/60/220-440 volts, 1740 RPM. Complete with starting panel, consisting of G.E. motorstarter switch, push button control, square "D" Switch, and capacitator.

Purchased new 3½ years ago. Excellent condition. Available for immediate delivery.

CONSOLIDATED PRODUCTS CO. INC.
13-20 PARK ROW NEW YORK, 7, N.Y.

Classified Advertising

For Sale

OVERHEAD CRANES

1-TON
Detroit 38' Span
Shepard Niles 12'

2-TON
Conco 12' Span
Chisholm Moore 25'
Shaw Box 17'7"

3-TON
P&H 42'1½" Span
Case 51'2" Span
P&H 37'6" Span
Niles 20' Span
Shepard 28' Span

5-TON
Alliance 95' Span
P&H 20' Span
Shepard 27'6" Span
Detroit 38'8" Span
P&H 75' Span
P&H 31'10" Span

6-TON
Northern 46' Span

7½-TON
P&H 60' Span
Hand-Operated 12' Span

10-TON
Alliance 58'9" Span
Shepard Niles 27'7½" Span
Morgan 55'6" Span
Ederer 74'4" Span
Lane 50' Span
Cleveland 51'3" Span
2 Yd. Morgan 60' Span
Northern 49'7" Span
Shepard Niles 57' Span
P&H 87'6" Span
Lane 60' Span
Shaw 80'9" Span
Toledo 77' Span
Whiting 48' Span
Shaw 67'6" Span
Morgan 38' Span

15-TON
Whiting 38' Span
Ederer 74'4" Span
New Albany 50'6" Span
Morgan 73'5½" Span
Bedford 34'6" Span

20-TON
Lane 50' Span
P&H 51'4" Span
Ederer 74'4" Span
Northwestern 60' Span
Whiting 75' Span

25-TON
Bedford 14'6" 67'8" 46'2" Spans
Leonard Burke 100' Span
Case 63' Span
New Albany 50' Span
Cyclops 74'4" Span

30-TON
Ederer 55' Span
Ederer 66'6" Span
Whiting 74'4" Span
Northern 75' Span
Ederer 40' Span
Ederer 76' Span

35-TON
Bedford 25'9½" Span
Cyclops 74'4" Span

50-TON
Morgan 50' Span

75-TON
Case 64'8¼" Span

150-TON
Whiting 30' Span

200-TON
Alliance 100' Span

Telephone us collect to discuss your requirements

ECONOMY CO., INC.
49 VANDERBILT AVENUE NEW YORK 17, N. Y.
TELEPHONE: MURRAY HILL 4-1616

FOR SALE

One Robins Portable 3 x 4 Shakeout with flask loader. 3 ph, 60 cy, 220 v., new.
One 4000 pound geared ladle.
Two 1000 pound modern cylindrical geared ladles.
One 500 pound ladle with double end shank.
Two 200 pound ladles with one double end shank.
One 1000 pound ladle with double end shank.
One McLeod Sand Blast.
1 double end grinder, motorized with model #1150 dustkop dust collector.

HILLSDALE FOUNDRY CO. INC., HILLSDALE, MICHIGAN.

NEW AND USED FANS AND BLOWERS

1—No. 7 E Buffalo, 60 hp. 3/60, 220-440 V motor and starter.
1—No. 5 Roots-Connersville rotary blower.
7—Spencer No. 1020, 2700 CSM at 16 oz., 20 hp., 3/60.

AC and DC electric motors and controls.
We buy and sell for cash.
Your inquiry is invited.

EDWARD J. BOYLE CO.
7702 EDGEWOOD AVENUE
PITTSBURGH 18, PA.
PHONE—BRANDYWINE 9083-84

FOR SALE

Used 30" Pangborn tumblast complete.
Used 10 ton Pauling & Harnischfeger traveling crane, 20 ft. span, complete.
Miscellaneous lot used iron and steel flasks, 24" x 24" to 72" x 72".
All above material in good condition.

DILL, INC.
P. O. BOX 311
RUSHVILLE, INDIANA

FOR SALE

One Westinghouse Electric & Manufacturing Co. standard forced convection circular pit-type furnace suitable for 1000° F. operation rated 75 KW, 3 phase, 440 volts complete with baffle, hearth grating fan and shaft. Inside dimensions 66" dia. x 46" deep. Complete with enclosed industrial heating control panel, Wheelco "Limitrol" and Leeds & Northrup "Micromax" recording controlling potentiometer pyrometer. Can hold maximum of 1,000 pounds of aluminum castings.

FISCHER CASTING COMPANY
P. O. BOX 1147
PLAINFIELD, NEW JERSEY

FOR SALE

1—#40 Model S.A. Davenport Rollover, excellent condition.
1—#34½" Whiting Lip Pouring Geared Ladle, never used.

BOX 318
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

120 sets 18⅝ x 18⅝ x 8" cope and 8" drag steel flasks. Like new.

CENTRAL FOUNDRY DIVISION
GENERAL MOTORS CORPORATION
DANVILLE PLANT
DANVILLE, ILLINOIS
FOR SALE

FOR SALE

Coleman roller drawer core oven. Five sections of six drawers each. 540 sq. ft. shelf area. Equipped with Ray combination oil and gas burner, 1,500,000 BTU capacity. With full automatic hot air re-circulator and necessary thermometers and instrumental controls.

WOLVERINE BRASS WORKS
GRAND RAPIDS, MICHIGAN

FOR SALE

15 ton OVERHEAD CRANE
90' span

Complete with motor generator set and 204' crane runway. Built 1942.

IRON & STEEL PRODUCTS, INC.
13444 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

FOR SALE

84" Diamond surface grinder motor drive with motor in operation $1,750.00

SHARP TOOL SERVICE COMPANY
5401 WEST LAKE STREET
CHICAGO, ILL.
EST. 1900 MR. P. J. MOONEY

FOR SALE

Midwestern foundry has approximately 200 steel flask sections, principally welded channel, in sizes from 19 x 23 x 6 to 72 x 84 x 12. Will dispose of whole or part due to closing of department. Write for circular with sizes and prices. Address: Box 389, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

One 150 KW Picker Industrial X-Ray Unit. Complete with accessories, drying cabinet, developing tanks, film hangers and film cabinet. Must sell. For full particulars write—

BOX 394
THE FOUNDRY CLEVELAND 13, OHIO

ELECTRIC FURNACE FOR SALE

3 ton Pittsburgh furnace, complete with ladles, charging chute, brick linings and roofs, etc. 1500 K.V.A. transformer 25 cycle.

BOX 435
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Two late model DeWalt radial foundry cut off saws, model ME-2. Excellent condition, at less than half of replacement cost.

R. A. VINE INC.
652 WEST WILLIS AVE. DETROIT, MICH.
TEMPLE 2-6110

GOOD BUY

1—Ransohoff Water Mill 36 x 60 side loading and end loading. Automatic star separation and star return. Complete with direct drive and in good condition.

BOX 419
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

Two—11" x 20"—4" cope & 6" drag Hines aluminum pop-off flasks.
Twenty-two—steel jackets for use with above.
Four—18" x 18"—4" cope & 6" drag Hines aluminum pop-off flasks.
Forty-four—steel jackets for use with above.

THATCHER FURNACE COMPANY
GARWOOD, NEW JERSEY

FOR SALE

(1) LG—9 six foot diameter Pangborn rable-blast. Complete unit.
(1) Parblast (Parson Engineering Corp.) cleaning room—complete.
This equipment is in excellent condition but in excess for the owners present cleaning operation.

BOX 431
THE FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—No. 1 Demmler Core Blowing Machine—$450.00
1—Haynes four-drawer Core Oven, complete with controls and burner. Original cost, $1000.00. Selling half-price, $500.00.

BOX 428
THE FOUNDRY CLEVELAND 13, OHIO

Classified Advertising

For Sale

FOR SALE

REBUILT EQUIPMENT

International Machines
3—Type R Hand Roll
1—International Pin Lift
2—JS International Rollovers
1—16 x 8 Air Jolt Rollover HJ
1—16 x 8 HJ Rollover
1—Arcade rollover machine 32 x 48 table stationary.

Osborne Machines
1—560 Pin Lift

Herman Machines
1—Jolt Rollover

Tabor Machines
3—Pin Lift Machines

Sprue Cutters
1—Sprue Cutter with 2 HP. Motor, V Belt Drive

Core Machines
1—#2 Demmler Core Blowing Machine Used Two Months
1—Tabor Core Machine

Electric Riddles
1—Combs, V Type

Tumbling Barrels
2—36 x 60 with Speed Reducers & Motors

Sand Blast Cabinets
2—#4 Tilting Type
1—Hovel 30 x 36

Air Compressors
1—Curtis 4½ x 4½ with Motor & Tank

Sand Blast Cabinets
1—Type K. 45" x 48" x 42" with Dust Arrestor. Practically New

Ladles
1—8 Ton Worm Geared
1—3000 Worm Geared
1—5000 Worm Geared

We also make New Ladles

Core Ovens
1—Half Round with Five Shelves 51" High, 54" Wide, 27" Deep. Coke or Gas Fired

We make new Core Ovens, Any Size & Type Desired, Shelf, Pull Out Drawer or Car Type

Core Plates

7½" x 10"	7½" x 18"
7½" x 12"	7½" x 20"
7½" x 14"	7½" x 22"
7½" x 16"	7½" x 24"

These are in ¼" Steel Plate

Core Plates, Ribbed
67 Pcs. 10" x 11"
47 Pcs. 16" x 18"
134 Pcs. 11½" x 12"
56 Pcs. 15" x 16" & 16" x 16"

Trucks
Hand Trucks #792 Fairbanks
6—Barrel Trucks, 2 Wheel, Rubber Tires
1—Automatic Lift Truck & Charger
Lyon-Raymond Hyd. Lift Truck 2500# Cap. Model CW-11-54

List of Steel Flasks

	Price per Set		Price per Set
17" x 27"— 4 Cope and 4 Drag	$11.00	18" Round—4" Cope and 3" Drag	7.00
12" x 31"—10 Cope and 10 Drag	14.00	18" x 20"—6½ Cope and 6½ Drag	12.50
11" x 14"— 4 Cope and 6 Drag	15.00	19" x 33"—6½ Cope and 3 Drag	12.50
19" x 18"—3½ Cope and 3½ Drag	7.50	17½" x 20"—6½ Cope and 3 Drag	11.00
12" x 31"— 7 Cope and 7 Drag	16.00	9 Cope and 3 Drag	11.00
18" x 19"—3½ Cope and 3½ Drag	11.00	13" x 35"— 6 Cope and 6 Drag	10.00

Miscellaneous Equipment

Chain Falls
2—1 Ton, New
2—5 Ton, New

Scales
2—Toledo Scales, New

Burners
5—Gas Burners

Riddle & Riddle Bottoms
20" Electric Riddle Bottoms
18" Hand Riddles, 5 Ply

Mixers
2—Blystone Mixers Motor Driven

Jolt Squeezers
2—Adams, Portable, Jolt Squeezers, Swing Head Type

Miscellaneous Equipment
1—Scleroscope
High Speed Motor & Blower for Brass
Furnaces different Sizes
15 Skids for Lift Truck
Assortment of New Emery Wheels
Air Grinders Portable
Air Bench Rammers
Air Floor Rammers
Vibrators
Chipping Hammers
2000 Ft of New ⅜" Air Hose
1000 Ft of New ¾" Air Hose
Branford Shakeout Vibrators

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST. **KALAMAZOO 52, MICH.**

FOR SALE—LIQUIDATION:
4 New Polishing & Buffing Lathes, 7½ H.P. Vari-Speed—Standard, 220-440 V. Speed 1500-3000 RPM.
1 Used Lindberg Cyclone Box type Heat Treat Furnace, complete with controls.
1 16" Sarnac Radial Cut-Off Machine 5 H.P. 440 V. Motor.
1 1000# Cap Hand tilt Fisher Furnace with 3½ H.P. 220-440 V. Blower. New—as received from factory.
Above items for quick sale and at bargain price.
PERMA-BRITE STAINLESS ALUMINUM INC., c/o THE CONNEAUT BANKING & TRUST CO., CONNEAUT, O.

FOR SALE

A Sly cupola 72" dia., complete with Sturtevant fan blower, size 8, No. 54891. Can also furnish practically new Spencer turbo blower.

We offer for sale 5 crucible melting furnaces, oil-fired for aluminum or nonferrous metal. Each furnace will hold a melt of approximately 2000 lbs. of brass mixtures. These are in good condition.

CONDENSER SERVICE & ENGINEERING CO., INC.
95 RIVER STREET, HOBOKEN, N. J.

FOR SALE

1 Pair 33" x 54"
Steel Exhaust Tumbling Barrels
Spur Gear Drive

THE SOUTHERN DESK COMPANY
Hickory, N. Y.

FOR SALE

4—500 lb. capacity 3 wheel buggy ladles with V tread roller bearing wheels, in perfect condition. Price $100.00 each.

THE LAKE ERIE FOUNDRY CO., INC.
GIRARD, PA.

FOR SALE

Patterns for memorial bronze tablets—five sizes and three designs a total of 16 metal patterns. Letters and numbers ½" to 3" sizes—large quantity. Bible plaque patterns. Nothing on the market like them. Metal flasks of different sizes approximately $300.00 worth. Bottom boards and equipment for making bronze tablets and jobbing bronze work. Can arrange to rent foundry building to buyer of patterns. $1500.00 for quick sale. Have been established twelve years in this town. Poor health reason for selling. Address: Box 417, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

Seneca Falls Lo-Swing Lathe; 60" centers, hardened ways and gears, 36" carriage.
New Britain Automatic, 6 spindle, 1⅝" capacity; many extras, thread cutting.
Heavy Under-Cut Cold Saw, 9" capacity.
Acme Tapper, 4 spindle, treadle-type, ⅛" capacity.
Universal Cylinder Grinders: Landis 10 x 24 and 12 x 36; B & S 10 x 24.
ALL GOOD CONDITION . . . LOW PRICED
JAY SALTER
306 ROSEDALE ST. ROCHESTER 7, N. Y.

FOR SALE

Hines Snap Flasks, heavy duty, all pins ¾" diameter. Sizes and conditions as follows:
1—24 x 48", 12" C and 12" D 50½" pin centers—Excellent.
1—34 x 37", 12" C and 12" D 51½" pin centers—New.
1—30 x 30", 12" C and 12" D 33" pin centers—Excellent.
1—36 x 36", 12" C and 12" D 40" pin centers—New.
1—42 x 42", 12" C and 12" D 46" pin centers—New.
If interested, please contact
LEBANON STEEL FOUNDRY
LEBANON, PA.

FOR SALE

1—405 Osborn jolt roll-over pattern draw; jolt cylinder 12" dia. Pattern draw 18" max. flask limit 64".

BOX 421
The FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—Battery of four 24" x 54" tumbling barrels.
1—30" x 52" tumbling barrel only.
1—30" x 38" tumbling barrel only.
4—18" x 52" tumbling barrel only.

BOX 420
The FOUNDRY CLEVELAND 13, OHIO

EQUIPMENT FOR SALE

One Nicholls #11-32 heavy duty combination jolt and power squeezer molding machine with pattern draw. Like new. $475.00
One Modern Equipment Co. cylindrical reservoir ladle with stand 29" dia.—1500# capacity. Good condition. No. 43252. $250.00

WELLS MANUFACTURING COMPANY
7800 NORTH AUSTIN AVENUE
SKOKIE, ILLINOIS

FOR SALE

Midwest plant has an American Foundry Equipment #2 wheelabrator tablast complete with motors and dust collector available for immediate delivery. Unit originally cost $7,010.00 and has been used only five years. Sales price $1,750.00. Address: Box 412, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Two Tabor 10" squeezers, $325.00. Complete. Like new. Address: P. O. Box 395, Rochester 2, N. Y.

FOR SALE

One nine-foot gauge Wellman-Seaver charging machine and thirty charging boxes for same. One No. 683 J & J jolt stripper 36" x 54", 16" draw. One No. 815 jolt rollover 30" x 40", 15" draw. One speedmuller model No. 40, including skip hoist and water meter. One 13' traction type sandslinger. Address: Box 391, The FOUNDRY, Cleveland 13, Ohio.

METAL RECLAIMING MILL

No. 5 size, a trade in for larger size, used about four years, as is without motor and V belt drive, good condition.

DREISBACH ENGINEERING CORP.
YONKERS 2, N. Y.

Classified Advertising

For Sale | For Sale | For Sale

LIQUIDATING!!

MODERN FOUNDRY EQUIPMENT
(NEW) 1942-1943

2—MAHR RECIRCULATING FURNACES
3—GAS MACHINERY CO., HEAT TREATING FURNACES, CAR TYPE
1—500 T. BALDWIN SOUTHWALK VER. HYDRAULIC PRESS, 4 COL.
1—2500 CU. FT. WORTHINGTON HOR. AIR COMPRESSOR, 350 HP SYN. MOTOR
1—#405 OSBORN ROLLOVER PATTERN DRAW MOLDING MACHINE
1—#561 OSBORN JOLT STRIPPER
1—#33 AMERICAN AIR FILTER ROTOCLONE
6—FOX & HAMMOND H.S. FRAME & SNAGGING GRINDERS
1—TYPE A-4 BRINELL TESTING MACHINE
1—KANE & ROACH CORE WIRE STRAIGHTENER & POWER SHEAR
1—HEBARD MODEL A-2 MULE TRACTOR GAS ENGINE
1—#92 OSBORN CORE BLOWER
1—SLY DUST FILTER & COLLECTOR, TYPE 360
2—2 TON CLEVELAND MONORAIL SYSTEMS
800—STERLING AND WADSWORTH STEEL FLASKS AND CORE PLATES
TYPE 57M & TYPE IP PANGBORN SANDBLAST ROOM AND ROTOBLAST CLEANING MACHINE.

Miscellaneous equipment includes:

Portable Arc Welders, Hyd. Lift Trucks, Dump Buckets, Casting Skip Carriers, 45" Elec. Lifting Magnet, Storage Tanks, Charging Buckets, cap. 80 cu. ft., (4) Whiting Crane Ladles, cap. 5 T., Preheaters, Pneu. Grinders, Chipping Hammers and Sand Rammers, Factory Flat Cars, Steel Racks . . . and many other items.

INSPECT AT: U. S. GOVERNMENT PLANT "B".
CAIRN ST. & B&O R.R., ROCHESTER, NEW YORK
For Complete Details, Specifications and Catalog—
write — wire — phone

INDUSTRIAL PLANTS CORPORATION
90 WEST BROADWAY, NEW YORK 7
—or—
WHITEHEAD, SANGER & HOIDGE
36 WEST 40th STREET, NEW YORK 18

COMPLETE EQUIPMENT OF IRON & BRASS FOUNDRY

Located in southern city. Price $4500—less than value of one piece of equipment. Carload of coke also included if sold immediately. Address: Box 294, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: Box 772, The FOUNDRY, Cleveland 13, Ohio.

CENTRIFUGAL CASTING MACHINE

We have a senior model Kalamazoo Universal spinning machine for sale, like new, with 1½ H.P. motor and 24" head, 220/440 volt, 60 cycle current. Price $1143.67 F.O.B. our plant. Address: Box 238, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM GAS FIRED FURNACE

No. 1400-IM Hausfeld stationary crucible aluminum Furnace, gas fired with silicon carbide lining, single valve control, sealed top. Furnace has never been used. Address: Box 387, The FOUNDRY, Cleveland 13, Ohio.

ROTOBLAST FOR SALE

1—No. 28, type GK rotoblast rocker barrel with a load capacity of 20 cu. ft., complete with motors, abrasive reclaimer, loader and many spare parts. This barrel was purchased new in 1942. Address: Box 269, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Freeman multi-blade 5 cubic foot capacity sand mixer with 5 H.P. motor. Used 2 years. Excellent condition. Address: Box 392, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—Mahr, model No. 556-C-750,000 B.T.U. oil fired, portable mold dryer. Brand new—never used. Attractively priced for quick sale. Address: Box 315, The FOUNDRY, Cleveland 13, Ohio.

FURNACE FOR SALE

Monarch simplex #94 rotating aluminum and brass melting furnace, 2000 lb. brass capacity; good condition and is on skids ready for shipping $950. Address: FLORIDA DIE CASTING FOUNDRY, P.O. BOX 1589, ORLANDO, FLA., PHONE 2-1838.

Accounts Wanted

REPRESENTATIONS WANTED

Organization with 25 years' connections in chain stores seeks item suitable for volume sales. Address: KARAVAN TRADING CO., 263 5th AVE., NEW YORK 16, N. Y.

FOUNDRY EQUIPMENT

Mechanical engineer-foundryman can efficiently handle sales and service of foundry equipment and supplies. Commission basis. Ohio and Pennsylvania. Successful sales and engineering experience. Can we meet to discuss details. Address: Box 351, The FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING RATES

POSITION WANTED

Minimum advertisement set solid 30 words $1.50. Additional words 5c each.

HELP WANTED

Minimum advertisement set solid 30 words or less $3.00. Additional words 10c each.

FOR SALE

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

WANTED

Minimum advertisement set solid, 30 words or less $3.00. Additional words 10c each.

Miscellaneous advertisements such as "Personals", "Services" etc., minimum 30 words set solid $3.00. Additional words 10c each.

NOTE: If replies are to be sent to a box number in care of The Foundry, add 6 words to your advertisement for box number and address.

Any advertisement set in all caps, add 50% to above rates.

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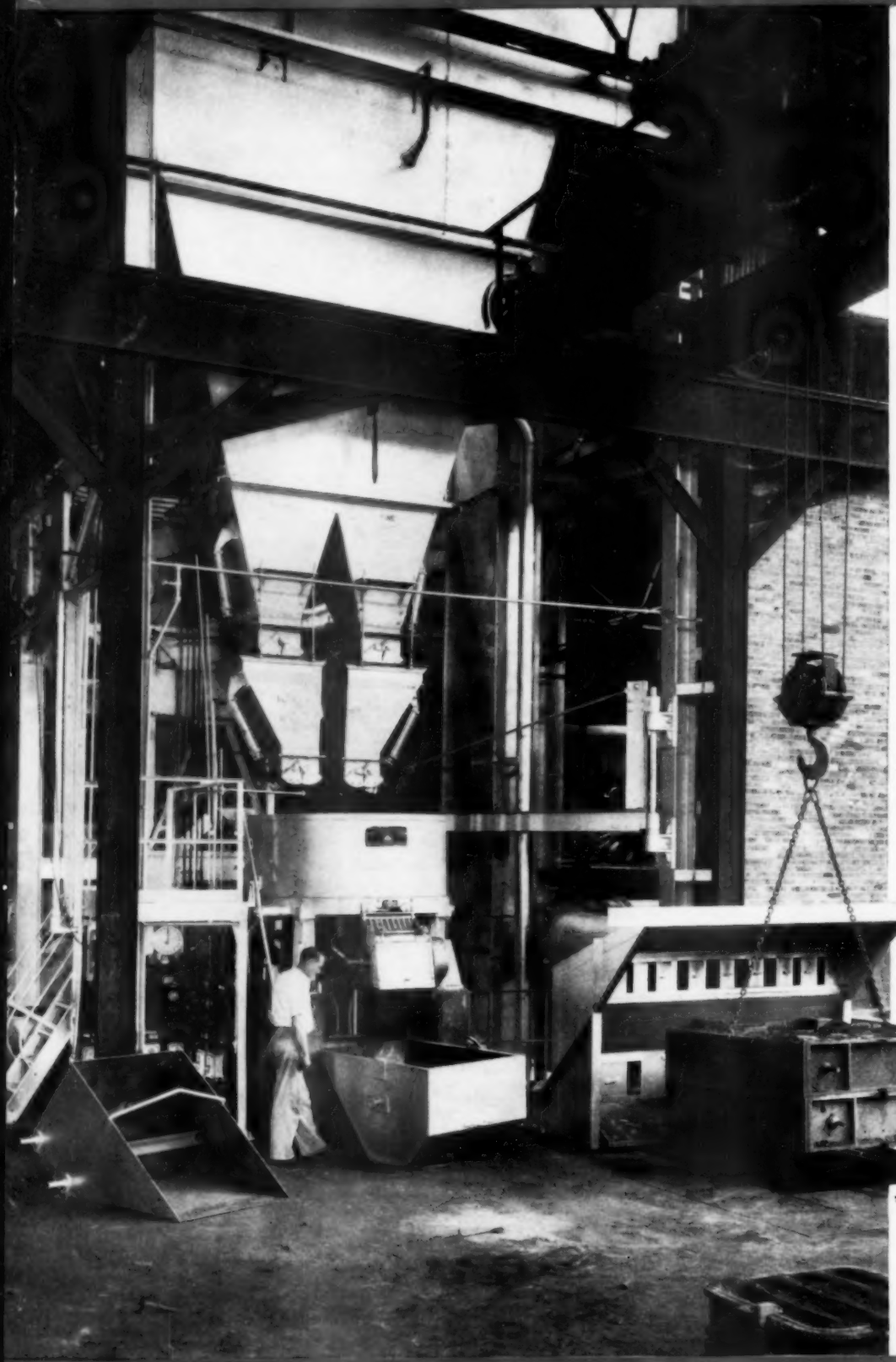

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